DOCUMENT RESUME

ED 230 816 CE 036 351

AUTHOR Nesbitt, William R.
TITLE Manual of First-Aid Practices for School Bus Drivers. Revised.
INSTITUTION California State Dept. of Education, Sacramento. Bureau of Publications.
PUB DATE 83
NOTE 88p.
AVAILABLE FROM California Dept. of Education, Publications Sales, P.O. Box 271, Sacramento, CA 95802 ($1.75).
PUB TYPE Guides - Non-Classroom Use (055)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS Adult Education; Bus Transportation; Driver Education; *First Aid; *Health Education; *Injuries; *School Buses; *Student Transportation
IDENTIFIERS *Bus Drivers; California

ABSTRACT

This manual is intended to provide California school bus drivers with the required course of instruction in first aid practices. It deals with the basic principles of handling serious medical emergencies, but major emphasis is on the variety of minor injuries or illnesses that may occur while students are riding on school buses. Chapter 1 covers determining the course and plan of action in each medical emergency. The next 15 chapters focus on first aid care for these types of emergencies: emergencies of the heart and circulatory system; wounds, bleeding, and bruises; breathing and airway maintenance; skeletal injuries and disorders; spinal injuries; injuries to the head and special organs; transportation of the sick and injured; unconsciousness, fainting, and convulsions; shock; poisoning and drug overdose; less serious medical problems; thermal, chemical and electrical injuries; foreign bodies; bites and stings; and mental health emergencies. Chapter 17 summarizes 10 important points from the manual. (YLB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED230816

Manual of First-Aid Practices for School Bus Drivers

By William R. Nesbitt, M.D.
Former Disaster Medical Coordinator
Emergency Medical Services Authority

CE 036 357

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

✓ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

T Smith

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Publishing Information

Copyright, 1983, by
California State Department of Education

This revised edition of the *Manual of First-Aid Practices for School Bus Drivers* was edited by Bob Klingensmith, Publications Consultant; prepared for photo-offset production by the staff of the Bureau of Publications, with artwork by Cheryl Shawver McDonald; and published by the California State Department of Education, 721 Capitol Mall, Sacramento, CA 95814.

Printed by the Office of State Printing
and distributed under the provisions
of the Library Distribution Act

1983

Copies of this publication are available for $1.75 per copy, plus sales tax for California residents, from:

Publications Sales
California State Department of Education
P.O. Box 271
Sacramento, CA 95802

A list of other publications that are available from the Department, *Selected Publications of the California State Department of Education,* may be obtained by writing to the same address.

Contents

	Page
Foreword	v
Preface	vii
I. Determining the Course and Plan of Action	1
II. Emergencies of the Heart and Circulatory System	8
III. Wounds, Bleeding, and Bruises	13
IV. Breathing and Airway Maintenance	17
V. Skeletal Injuries and Disorders	25
VI. Spinal Injuries	31
VII. Injuries to the Head and Special Organs	34
VIII. Transportation of the Sick and Injured	43
IX. Unconsciousness, Fainting, and Convulsions	46
X. Shock	49
XI. Poisoning and Drug Overdose	53
XII. Medical Emergencies	56
XIII. Thermal, Chemical, and Electrical Injuries	61
XIV. Foreign Bodies	66
XV. Bites and Stings	68
XVI. Mental Health Emergencies	73
XVII. Summary	77
Index	79

Foreword

California's school bus drivers have compiled an outstanding record of service to their communities, both behind the wheel and in related functions, such as providing emergency first-aid care for their passengers and others. But they did not establish that record by mere chance. It is the result of thousands of conscientious persons being particularly aware of their responsibilities and of giving many long hours of practice and study to meet those responsibilities.

As a school bus driver, you may rarely, or perhaps never, be called on to care for the sick or injured. But because of the numbers of children you transport and the frequency with which you operate your vehicle on dangerous streets and highways, it is quite probable that someday you will have to provide at least minor emergency care in the course of your duties.

Your dedication to mastering the skills involved in basic first-aid practices may prove to be just as important as your devotion to being the safest driver possible. Your degree of preparedness could make the difference between life and death, between temporary and permanent disability, or between rapid recovery and long hospitalization for a passenger, another victim, or even yourself.

My staff informs me that the 1980 edition of the *Manual of First-Aid Practices for School Bus Drivers* was the best selling Department of Education publication in both 1980-81 and 1981-82. That statistic pleases me greatly, because it indicates a priority among school personnel to ensure that schoolchildren have the best possible care and services available to them while traveling in school buses. The popularity of this publication, both in California and across the nation, attests to its quality and usefulness. On behalf of the Department, I thank and congratulate all those who helped to produce this 1983 edition. I am confident that its use by both experienced and new drivers will be a vital part of the statewide effort to maintain the high standards that have always been demanded of those transporting schoolchildren in this state.

Bill Honig

Superintendent of Public Instruction

Other Publications Available from the Department of Education

A *Manual of First-Aid Practices for School Bus Drivers* is one of approximately 500 publications that are available from the California State Department of Education. Some of the more recent publications or those most widely used are the following:

Accounting Procedures for Student Organizations (1979)	$1.50
California Private School Directory	9.00
California Public School Directory	12.50
California Public Schools Selected Statistics	1.50
California School Accounting Manual (1981)	2.50
Discussion Guide for the California School Improvement Program (1978)	1.50*†
District Master Plan for School Improvement (1979)	1.50*
Farm Labor Drivers and Carriers Handbook (English/Spanish) (1981)	3.50
Guidelines for Bus Evacuation and Instruction in Safe Riding Practices (1982)	1.50
Guidelines for School-Based Alcohol and Drug Abuse Programs (1981)	1.00
Handbook for Planning an Effective Mathematics Program (1982)	2.00*
Handbook for Planning an Effective Reading Program (1979)	1.50*
Handbook for Planning an Effective Writing Program (1982)	2.00*
History—Social Science Framework for California Public Schools (1981)	2.25
Improving the Human Environment of Schools (1979)	2.50
Manual of First-Aid Practices for School Bus Drivers (1983)	1.75
Pedestrian Rules of the Road in California—Primary Edition (1980)	1.50
Physical Performance Test for California, Revised Edition (1982)	1.50
Planning for Multicultural Education as a Part of School Improvement (1979)	1.25*
Planning Handbook (1978)	1.50*
Putting It Together with Parents (1979)	.85†
Reading Framework for California Public Schools (1980)	1.75
Relationship Between Nutrition and Student Achievement, Behavior, and Health (1980)	4.00
Science Education for the 1980s (1982)	2.00*
Science Framework for California Public Schools (1978)	1.65
School Bus Inspection and Maintenance Guide (1978)	2.00
School Improvement: Making California Education Better (brochure) (1981)	NC*
Student Achievement in California Schools	1.75
Students' Rights and Responsibilities Handbook (1980)	1.50†
Toward More Human Schools (1981)	1.75

Orders should be directed to:

California State Department of Education
P.O. Box 271
Sacramento, CA 95802

Remittance or purchase order must accompany order. Purchase orders without checks are accepted only from government agencies in California. Sales tax should be added to all orders from California purchasers.

A complete list of publications available from the Department may be obtained by writing to the address listed above.

*Developed for implementation of School Improvement.
†Also available in Spanish at the price indicated.

Preface

The purpose of this manual is to provide school bus drivers with some basic knowledge about medical emergencies. A few basic principles well learned and correctly applied will be of considerable value in meeting these emergencies.

The number of pupils transported daily by school buses runs into the hundreds of thousands, and so medical emergencies of one type or another are bound to occur daily.

Although serious school bus accidents happen but rarely, they do occur; and they constitute the most likely situations in which school bus drivers will be called upon to deal with serious injury among students in their charge. Other situations where they may have to deal with serious injury can occur when they come upon a highway accident or other emergency medical situation not involving school personnel.

This manual deals with the basic principles of handling serious medical emergencies, but major emphasis is on the variety of minor injuries or illnesses that may occur while students are riding on school buses. These minor injuries should be a concern to every school bus driver. For this reason school bus driver competency in first aid is required by state law. State of California Vehicle Code, Section 12522, "First Aid Examination for School Bus Drivers," states the following:

(a) Every person who operates a schoolbus in the transportation of school pupils shall, in addition to any other requirement for a schoolbus driver's certificate, qualify by an examination on first aid practices deemed necessary for schoolbus operators as determined and prescribed by the State Department of Health Services after consultation with the Departments of Education, Motor Vehicles, and California Highway Patrol. The local school authority employing the applicant shall provide a course of instruction concerning necessary first aid practices.

(b) The California Highway Patrol shall conduct the first aid examination as part of the examination of applicants for a schoolbus driver's certificate and shall certify to the Department of Motor Vehicles that

the applicant has satisfactorily demonstrated his qualifications in first aid practices, knowledge of schoolbus laws and regulations, and ability to operate a school bus. The first aid certifications shall be valid for the term of the schoolbus driver's certificate.

(c) The first aid examination may be waived if the applicant holds a first aid certificate issued by the American Red Cross or the United States Bureau of Mines that will remain valid throughout the term of the schoolbus driver's certificate.

This manual was developed to assist local school authorities in providing the required course of instruction in first-aid practices for school bus drivers. The California Highway Patrol bases its first-aid examination on the material included in this manual. Therefore, the school bus driver is expected to learn the contents of these chapters thoroughly.

The material in this manual was not designed to be an in-depth first-aid course. Rather, the manual is based on the assumption that help for a school bus driver is never very far away and that the necessity for providing medical support for a child with a sudden illness or injury will be for a brief period of time and only until skilled medical help is available. Therefore, emphasis will be placed on those situations that the school bus driver is most likely to encounter.

The California State Department of Education acknowledges the contribution of William R. Nesbitt, M.D., former Disaster Medical Coordinator, Emergency Medical Services Authority, who prepared the manuscript for the 1980 edition of this publication and provided technical assistance in the preparation of this 1983 edition. The Department also acknowledges the assistance of the transportation staff of the Fairfield-Suisun Unified School District in the preparation of the 1980 edition. Blair Hansen, former Managing Editor of the Bureau of Publications, was the editor of the 1980 edition, and he made significant contributions to its development.

GILBERT R. MARGUTH, JR.
Deputy Superintendent
for Administration

ERNEST LEHR
Chief, Field Management
Services Bureau

1
Determining the Course and Plan of Action

Three actions should be carried out at each medical emergency, and these actions should be carried out at the same time if possible, since time usually is a very important element in the eventual recovery of the injured or ill person. The actions to be taken are (1) evaluating the scene; (2) evaluating the circumstances; and (3) determining the actions to be taken and their correct order.

Evaluating the Scene

Evaluating the scene should be done quickly and should include as many details as can possibly be remembered. Evaluation must be done immediately to prevent further exposure of people to danger or injury. All appropriate safety measures must be taken.

Situation	*Action*
• Fire present in the bus	• Evacuate the bus; then use a fire extinguisher or water or smother with blankets or heavy clothing, such as a coat.
• Smoke, carbon monoxide, or other dangerous gases, such as chlorine or ammonia, present in the bus	• Ventilate the bus immediately if possible. Do not attempt a rescue that will take you any longer than you can hold your breath, if a heavy concentration of smoke or gases is present. The use of a handkerchief over the nose and mouth will not protect a person against the inhalation of gases.
• Victim of electric shock	• Cut power if possible. If cutting the power is not possible, move the person or the wire by use of a long dry stick held with gloves or a heavy piece of clothing wrapped around the end of the stick so as to prevent shock. Make sure everything is dry: the stick, the clothing,

Situation	*Action*
	and you. Also, find something dry (such as a board, cardboard, or other nonconductive material) to stand on, especially if the ground is wet (Fig. 1).
• Live electrical power line touching bus	• Do not evacuate bus until power is turned off. Children are to remain in their seats and to sit perfectly still.
• Fire or threat of fire from electrical power line	• Locate exit farthest from power line. Passengers are to jump from the bus so they do not touch the ground and bus at the same time (Fig. 2). Do not stand on the ground and help passengers off.
• Drowning	• Attempt rescue only if certain that you will not become a victim yourself. Use floating objects that will support two people in the water (such as large pieces of Styrofoam, life preservers, and buoyancy cushions).

Fig. 1. Removing live electrical wire from school bus, using a dry stick

Fig. 2. Evacuating children safely from bus that has live electrical wire on it

Evaluating the Circumstances

Knowing as much as possible about the cause of the injury or illness can be of great value in the further treatment of the ill or injured person. The kinds of information of value are the amount and kind of force involved in any injury, where the injured person was found, and what objects were involved in the emergency, such as bottles, syringes, medicine, alcohol bottles, or indications of drugs' being taken. Other information of vital importance is exactly what happened, specific details of how the accident occurred or of how the illness began.

Evaluating the Injuries and Deciding on the Order of Care

The action for each problem listed in this section will be described in detail in the section devoted to that problem. The following problems are listed according to their general order of importance; however, the severity of the problems may determine their order.

Checks	*Immediate Action*
• Check for breathing.	• Use rescue breathing.
• Check for heartbeat (pulse).	• Apply heart (chest) compression if the person is unconscious and heartbeat is absent.
• Check for profuse bleeding.	• Apply pressure on bleeding area.

Checks	*Immediate Action*
• Check for shock.	• Put in horizontal position and keep warm.
• Check for level of consciousness (head injury). Is person alert, responsive to command, drowsy, or unconscious?	• Put in horizontal position; give nothing by mouth.
• Check for neck or back injury.	• Use extreme care in moving the person. Immobilize neck or back if injury is suspected.
• Check for fractures.	• Immobilize part if fracture is suspected.
• Check for internal injuries.	• Get victim to a physician if injury is suspected.
• Check for Medic Alert tag.	• Ensure information accompanies victim.

Determining Resources for Effective Medical Care

A person can render effective medical care much more quickly if he or she is thoroughly familiar with the resources at his or her disposal. The following procedure should be used in determining resources:

1. Determine whether anyone who rides your bus or anyone who is immediately available has had first-aid training.
2. Evaluate the passengers on your bus to determine what each one might contribute if an emergency should arise. (For example: Are there strong boys or girls who could assist in carrying a sick or injured person? Which of the passengers would be the most reliable and most accurate messenger? Which passenger could most likely face illness or injury in another person and still be able to help with the application of bandages, splints, or other medical care?)
3. Learn thoroughly what first-aid supplies you have available in your first-aid kit and how they should be used.
4. Learn what materials or equipment in or on your bus may be improvised and adapted for first-aid use.
5. Evaluate communication capabilities on your bus and along your route so that you are familiar with the closest means of communication at any point on your regular driving route.

6. Determine what available emergency transportation and medical facilities can be used at any point along your bus route, such as the closest ambulance, the closest taxi stand, or the closest doctor's office.
7. Inquire of the school nurse whether any children on the bus have medical problems that you need to know about, and keep a card available and on file in your bus with the names of students who are taking medications and who have illnesses that might result in a sudden emergency. This information can usually be supplied by the school nurse.

Establishing Priority of Care for Ill or Injured Persons

If more than one person is injured or ill, establish immediately the priority of care for all individuals needing it. If communications are available and if their use would not cause undue delay, have in mind the place with which you wish to communicate and the persons with whom you wish to communicate, including names, telephone numbers, and alternates to call if the persons wanted are not immediately available.

Establish with school authorities a list of persons who should be notified in the event of medical emergency. Suggested people and agencies to notify are the following:

1. Fire department (usually the most rapidly available source of help)
2. School authorities
3. Parents
4. Physician or other medical practitioner
5. Ambulance
6. Police
7. California Highway Patrol (CHP)

Fire departments have trained personnel available to respond immediately to a call for serious illness or injury.

Evaluating Transportation Needs

The following points should be considered in evaluating transportation needs for transporting ill or injured persons:

1. Does the injured person need specialized transportation to prevent further injury; for example, injury to the neck or back?
2. Can ordinary modes of transportation, such as a bus or automobile, be used to get the injured or ill person to medical care more quickly than an ambulance and without doing him or her further harm?
3. Call for specialized transportation if there is any doubt.

Those conditions for which ambulance transportation is usually needed are the following:

1. Injuries to the spine or neck
2. Multiple injuries
3. Major fractures
4. Serious head injuries

The school bus driver should remember that priorities may change. He or she should be flexible and use good judgment regarding the most intelligent way to render first aid and to transport a victim to a hospital for specialized medical care.

Developing a Plan for Transportation of Ill or Injured Persons

The following suggestions are important considerations in developing a plan for transporting sick or injured persons:

1. Evaluate the seriousness of the illness or injury.
2. Decide what you must do to care for the ill or injured person.
3. Decide how and when you will communicate with appropriate persons.
4. Determine where you want to transport the person and what will be the safest and most rapid method of transportation available.
5. Determine whether it is better for you to transport the injured person to medical help or to request that medical help come to you.
6. Identify those who are available and who can be of most help, and consider how they can be most effective.
7. Do no harm. Often in attempting to help an ill or injured person, one can accidentally aggravate the person's injury because of inadequate training. Therefore, if more skilled medical help is readily available, the school bus driver should call on that help. If such help is not available, the school bus driver should take charge and do the best he or she can in accordance with his or her first-aid training. However, he or she must remember to do nothing that might cause further injury or harm to the victim.

Summarizing the Course and Plan of Action

The following points summarize the course and plan of action in rendering effective first aid to ill and injured persons and transporting them for specialized medical care:

1. Evaluate the scene, and collect all information possible on the cause of the injury or illness and the circumstances surrounding it.
2. Evaluate the injuries, and establish the order that should be followed in caring for them.

3. Identify your resources, and make them available for use.
4. Decide on a plan for the most effective use of available communication and transportation resources.

The school bus driver must remember that breathing, heartbeat, bleeding of a profuse nature, and shock are the four most important conditions to evaluate and must be cared for immediately if the person is to survive. Prevention of further injury in moving and transporting the victim is also extremely important.

II
Emergencies of the Heart and Circulatory System

Emergencies of the heart and circulatory system include heart attack, lack of heartbeat, heart failure, pulse abnormalities, heart palpitation, circulation problems, artery problems, and shock.

Heart Attacks

Heart attacks seldom occur in individuals before the age of twenty years. The frequency of heart attacks among the general population increases with age.

Signs and Symptoms	*Action*
• Victim may have tight or crushing pain in chest, frequently radiating to arms, shoulders, back, neck, or jaw. • Pain may come in waves or may remain constant. • Victim may become nauseated, weak, or short of breath and may perspire. • Victim lacks heartbeat.	• Anyone experiencing these symptoms should have immediate medical care. The heart can suddenly stop beating. In this event, heart compression or cardiopulmonary resuscitation (CPR)* should be started by a trained person. • If breathing stops, give rescue breathing. • Call for medical help.

No Heartbeat

The best method to determine whether a person's heart is beating is to feel for the pulse just beside the windpipe. On each side of the windpipe is a large artery called the carotid artery. Generally, a pulse can be felt here when it cannot be felt at any other location in the body. In order to check the pulse at this location, place three fingers

*Adequate instruction in cardiopulmonary resuscitation is beyond the scope of this manual, but it is strongly recommended that every school bus driver get this training. It takes about four hours, and your local hospital, fire department, heart association, or the like will tell you when the next course will be given.

alongside the victim's windpipe and press gently backwards. The carotid artery should be felt pulsating on one side of the windpipe as the fingers are pressed gently toward the back of the neck (Fig. 3). If the heart is not beating, proceed at once with cardiac compression. If the person is breathing, moving, or showing other signs of consciousness, the heart is beating and heart compression (CPR) should not be performed.

Fig. 3. Checking carotid artery for sign of pulse

Heart Failure

The following signs and symptoms are characteristic of heart failure:

Signs and Symptoms	*Action*
• Shortness of breath • Coughing up of froth, sometimes pink • Marked swelling of ankles	• Put the person in position of greatest comfort for breathing (usually sitting), and transport him or her to a physician as quickly as possible.

Pulse Abnormalities

Pulse abnormalities include rapid pulse, weak pulse, and irregular pulse or palpitations.

Rapid pulse. Sometimes, individuals, including schoolchildren, will suddenly develop a very rapid pulse (called paroxysmal tachycardia). This is usually not dangerous, but it creates a lot of anxiety and should be evaluated immediately by a doctor.

Signs and Symptoms	*Action*
• Pulse over 170, apprehension and weakness	• Keep person quiet, and have him or her examined by a doctor.
• Weak pulse	• Have medical evaluation immediately.
• Irregular pulse	• Have person examined by a doctor immediately.

Strenuous exercise, fright, or apprehension may cause the heart to beat rapidly, but usually the heart rate begins to slow a few minutes after the cause is over. With rapid pulse the heart can continue to beat fast for an indefinite period. The rapid pulse may spontaneously slow as quickly as it started, or it may continue until medical treatment is given.

Irregular pulse. A child may feel as if his or her heart has "turned over" or is "beating funny." The first time this happens, it can be very frightening to a child. In general, it is not serious; however, it is best for a child to be reassured by having his or her heart examined by a doctor.

Circulation

Circulation problems resulting from illness or injury include damage to the veins and arteries.

Veins. Following certain types of injuries, blood vessels may be damaged. Appropriate and immediate care can shorten recovery time considerably. The most common sites of blood vessel injury are in the fingers, hands, and forearms. However, with a person who has varicose veins, the site is usually in the legs.

Sign	*Action*
• Rapid development of bluish lump under the skin	• Elevate part at once; apply cold to site; and apply snug compression bandage, preferably elastic.

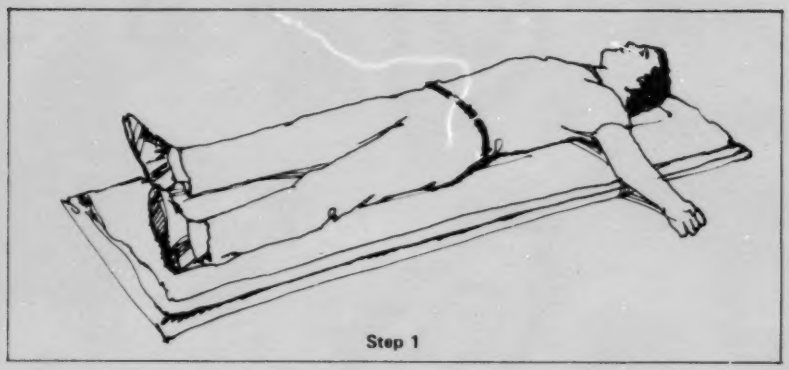
Arteries. Occasionally, arteries are injured. Such injury may be caused by a direct blow, resulting in severe spasm or clot formation, or it may be caused by a fracture when a broken end of a bone damages an artery. When arteries are injured so that the blood flow is stopped, the tissue supplied by those arteries is likely to start to die.

Signs and Symptoms	*Action*
• Injured limb may be cold. • Tissue color is white, gray, or grayish blue. • Flesh may be numb. (*NOTE:* Numbness can be the result of a bandage that is too tight.)	• Keep injured part level or slightly elevated. • Do not apply heat or cold. • Do not permit part to be used. Transport person to medical care at once.

Shock

Shock occurs when something happens that reduces the flow of blood to the brain and to other vital organs. Shock can cause death if not treated promptly. A person can be in shock even though there is no obvious injury. **All persons with serious injuries should be treated for shock whether they show signs and symptoms or not.**

Signs and Symptoms	*Action*
• Pulse is weak and rapid or may be undetectable. • Skin is cool and moist. • Skin color is pale white to grayish blue.	• Keep person lying down flat. • Protect from loss of body heat by using blankets, clothing, or heating pad. Be sure to put blankets or warm clothing under the person; heat can be lost more quickly into the ground than into the air. Two layers of clothing or blankets should be placed under the injured or ill person for every layer of clothing or blankets placed over the person (Fig. 4). • If person has been burned or injured, give nothing to eat or drink.



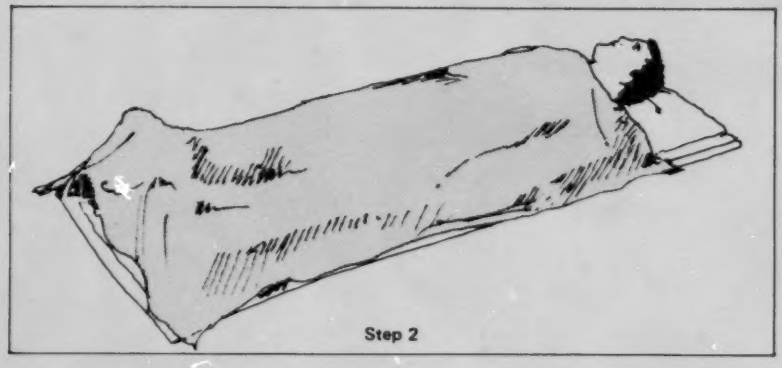


Fig. 4. Protecting victim against loss of body heat

III
Wounds, Bleeding, and Bruises

This chapter, "Wounds, Bleeding, and Bruises," includes information on the procedure to follow in treating cuts or lacerations, abrasions, puncture wounds, circulation damage, and nerve damage.

Puncture Wounds

Puncture wounds may be caused by nails, pins, bullets, knives, and so forth. These objects may cause dirty or clean wounds. Frequently, in puncture wounds dirt and other foreign material that contains bacteria and that will cause infection are carried under the skin. In the case of puncture wounds, it is sometimes hard to judge how much damage has occurred under the skin. Even small puncture wounds can sometimes carry enough bacteria to cause lockjaw and other serious infections.

Sign	*Action*
• Puncture wounds are small holes that penetrate the skin.	• See a doctor for possible tetanus shot.

Cuts or Lacerations

Cuts or lacerations may be clean or dirty, large or small. Cleansing cuts and lacerations and evaluating them for stitches can best be done by a physician or a nurse.

Sign	*Action*
• The cut or laceration may bleed very little or may bleed profusely.	• Apply clean dressing. If bleeding is profuse, apply pressure dressing. Refer to a doctor for possible stitching.

Abrasions

Abrasions occur when the top layers of the skin are scraped away; for example, skinned elbows and skinned knees. Often, dirt and gravel are embedded in the skin when abrasions occur. If this foreign matter is not removed, infection and possible permanent discoloration of the skin may occur. If the abrasion is minor, gentle washing with clean warm water and a bland soap may be all that is necessary to remove the dirt. Then the abrasion should be covered with a clean dry dressing. Abrasions that are dirty or deep or that involve a large area of skin should be evaluated by a health professional.

Bleeding

Bleeding is one of the critical emergencies that needs immediate attention. Several kinds of bleeding occur: (1) oozing from very small vessels; (2) bleeding from veins (dark color and steady flow); and (3) bleeding from arteries (bright red, may be seen to spurt). Bleeding from arteries requires more pressure to stop than bleeding from veins. Excessive loss of blood can cause shock and eventual death if bleeding is not controlled.

The following actions must be taken to prevent excessive blood loss of injured persons:

1. Elevate the bleeding part above the level of the heart if possible. Such elevation of the injured part may be enough to stop bleeding from veins; but, unless a pressure dressing is applied to the wound, bleeding may start all over again when the part is lowered (Fig. 5).
2. Apply direct, firm, even pressure over the wound with a dressing or clean cloth. If no dressing or clean cloth is available, use your hand.
3. Apply a bandage or clean cloth firmly over the dressing to maintain pressure (Fig. 6).
4. If blood soaks through, apply more dressings and bandages over the old ones.

Use of Tourniquets

Use of a tourniquet may be necessary to control excessive bleeding that threatens life:

1. A tourniquet must not be used unless severe life-threatening bleeding cannot be stopped in any other way.
2. Tourniquets can be used only on upper arms and thighs and must be applied between the wound and the body (Fig. 7).
3. Tourniquets can be approximately 3 inches wide (about 7.5 centimetres). A triangular bandage that is folded into a 3-inch (7.5-centimetre) width, wrapped twice around the extremity,

Fig. 5. Preventing excessive bleeding from severe laceration by applying direct pressure over the wound

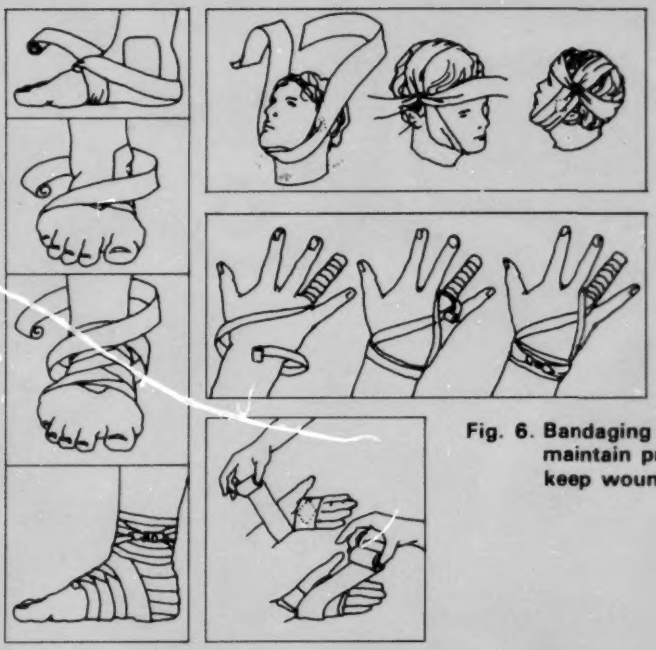


Fig. 6. Bandaging wounds to maintain pressure and keep wounds clean

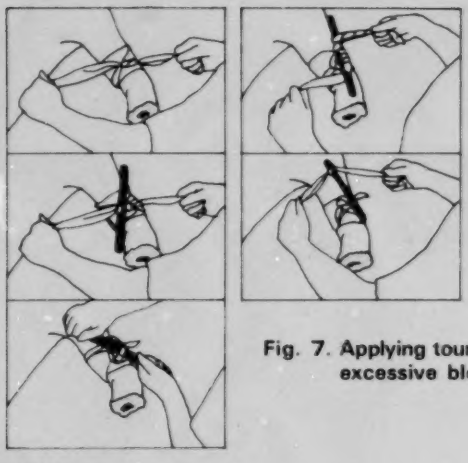


Fig. 7. Applying tourniquet to stop excessive bleeding

and then twisted with a stick makes a satisfactory tourniquet. *Tighten only enough to stop the bleeding.*

4. Once applied, a tourniquet should not be loosened until the injured person reaches medical aid. The injured person should be transported at once to a doctor.

Bruises

Bruises are caused by some external force breaking blood vessels in and under the skin, resulting in "black and blue" marks.

The elevation of the bruised part, if practical, and the application of something cold for 30 minutes will reduce the size of the bruise. Application of cold is especially valuable for large or severe bruises.

The Circulatory System and Nerve Damage

The ends of the fingers and toes should be checked for feeling and for evidence of good circulation. If circulation is absent or is poor, the fingers or toes of the affected extremity may be white-purple (cyanotic) or numb.

IV
Breathing and Airway Maintenance

Breathing may stop or be seriously impaired for the three following reasons:

1. Air may not be able to move in and out of the lungs, because the air passages are obstructed. This obstruction can be caused by the tongue's falling back in the mouth; by blood or mucus in the respiratory tract; or by some foreign body's, such as a piece of meat or candy, becoming lodged in the windpipe.
2. The brain centers controlling breathing may stop functioning. This cessation in functioning may occur because of poisoning, drowning, severe electric shock, or head injury.
3. A person may stop breathing because the bellows action of the chest has been interfered with in some mechanical way. This interference may be caused by compression of the chest through accidents, such as a cave-in, where dirt, sand, or other material prevents chest movements. It may be caused by fracture of the ribs along each side of the chest, making the muscles that move the chest up and down ineffective. It may also be caused by an open wound that penetrates the chest, causing what is called a "sucking wound" of the chest. This kind of wound prevents the lungs from expanding when the chest cavity is expanded.

The person that is deprived of oxygen needs medical help as rapidly as possible. Most people can do without oxygen for up to four minutes without sustaining serious injury. After four minutes, brain damage is likely to occur. Therefore, the first aider should always attempt to restore respiration, since he or she cannot be sure whether or not irreversible damage has occurred. Under some circumstances, however, a person can survive for longer periods of time without serious injury to the brain.

Choking

Anything stuck in the throat of a person and blocking his or her air passage may prevent breathing and cause unconsciousness or death within a few minutes. A choking victim who can speak, cough, or

breathe should not be interfered with. The person should try to solve his or her own problem. He or she can probably do it better than anyone else. If breathing stops, however, and the person cannot speak, cough, or breathe, the following antichoke maneuver (Heimlich Maneuver) must be performed.

Situation	*Action*
• The person may be gasping for breath. • Skin may be turning dusky blue. • The person may have been eating at the time. • The person may lose consciousness.	• Grasp from behind with hands clasped halfway between the navel and the breastbone. • Give a quick squeeze inward and upward under the rib cage. • If not successful the first time, repeat several times. • If person is unconscious or lying down, place hands over the stomach halfway between the navel and the breastbone, and push sharply inward and upward (Fig. 8).

With choking victims, air is usually trapped in the lungs. A quick compression of the chest will frequently pop the obstruction out of the person's throat like a cork being blown out of a bottle. This maneuver may be repeated several times. If still unsuccessful, the first aider should insert two fingers into the victim's mouth and determine whether a foreign object can be retrieved in that manner. Great care should be taken not to push the foreign object farther down the throat. If the person falls to the ground during a choking attack, he or she should be turned on his or her back, and with the hands close together in the area halfway between the victim's navel and breast-

Fig. 8. Applying Heimlich Maneuver in standing and prone positions

bone, the first aider should give a vigorous inward and upward push, thus compressing the air in the lungs and attempting to pop out the object obstructing the airway.

Actions for Breathing Emergencies

When a person is found unconscious and does not appear to be breathing, certain steps should be taken immediately. First, the situation in which the person is found should be evaluated to ensure that the cause for the cessation of breathing does not still exist. The first aider must make certain that the person is not in contact with an electrical wire or other device that might have caused shock. If such is the case, the electricity should be turned off, or the person should be removed from the electrical source by means of a dry stick, as previously described.

Also, the first aider should determine whether some poisonous or dangerous gas or noxious fumes have caused the person to stop breathing and are still present. If this is the case, the person should be dragged quickly into an open fresh air space before rescue breathing is started. An attempt should be made to awaken the person by shaking and shouting. The person should be asked whether he or she is all right. If there is any response, such as a moan or a sigh, the person, in all probability, is breathing. Second, if no response is noticed, the first aider should check for signs of breathing. The first aider should ensure that the person is lying on his or her back. If it is necessary to roll the victim over, the entire body should be moved at one time. Tight clothing should be loosened from around the neck or chest. The airway must be checked for obstruction.

If the victim is unconscious, sometimes it is very difficult to tell whether he or she is breathing or not, especially if the person is wearing heavy clothing. Several things should be looked for to determine whether or not the person is breathing:

1. Gently lift the neck with one hand while pushing back on the forehead with the other hand, thus tilting the head backwards. This head position keeps the tongue from blocking the throat (Fig. 9).
2. Look for chest movements. Does the chest move up and down with respiration?
3. If no chest movements are seen and if breathing cannot be heard, there is still a possibility that the person is breathing. By use of a small wisp of cotton or a strip of single-layered tissue paper placed directly over the opening of the nose or the open mouth, a first aider can see any movement of the cotton or tissue paper as the air is inhaled or exhaled (Fig. 10).

4. On a cold day, if a mirror or a piece of glass is placed near the opening of the nose or the open mouth, the cold glass, metal, or mirror will fog. A pair of eyeglasses makes a satisfactory object to test for condensation of moisture. However, whatever object is used must be much colder than body temperature; otherwise, condensation will not take place. If breathing is not present, proceed with mouth-to-mouth resuscitation, as described in this section.
5. If you think the person is not breathing or if there is any question as to whether or not the person is breathing, assume that the person is not and give rescue breathing immediately. Do not waste time doing the above mentioned tests.
6. Have someone else summon professional help.

Rescue Breathing

Rescue breathing steps must be performed in the following manner and order:

1. Clear the airway. While holding the person's head in the tilted-back position, insert two fingers into the person's mouth, and

Fig. 9. Opening airway by tilting head

Fig. 10. Checking with tissue paper for signs of breathing

search for any foreign objects or for the presence of dirt or secretions.

If dirt, secretions, or particles of material are present, they may be obstructing the person's airway. Try to sweep them out with your fingers or take a handkerchief wrapped around your fingers and repeat the maneuver, getting as much of the material out as possible. In doing this, sometimes turning the person's head to one side will facilitate the operation.

If an object that cannot be removed with your fingers is encountered, proceed with the procedure for choking (Heimlich Maneuver).

2. If the airway is clear, start mouth-to-mouth rescue breathing (Fig. 11). With your hand still on the person's forehead and his or her head tilted back, pinch the nose shut with your fingers, take a deep breath, and place your open mouth over the victim's open mouth. (Maintaining the head in a tilted back position helps to keep the airway open.) Blow the air into the victim's mouth, observing to see whether the chest rises. Repeat this quickly four times. After the fourth breath, feel the victim's neck, as described earlier, to see whether a pulse is present. If no pulse can be felt, someone should start cardiac compression if he or she has had training in this procedure. Continue with the rescue breathing, using one breath every five seconds or 12 times a minute. When removing your mouth from the victim's mouth, turn your head to the side and listen to determine whether you can hear escaping air or observe whether the chest falls. If either one of these things is noted, you can be sure that your rescue breathing is working. Continue this effort until help arrives.
3. Mouth-to-mouth rescue breathing can be performed on an infant or small child. With an infant, the procedure is essentially

Fig. 11. Performing mouth-to-mouth rescue breathing

the same, except the mouth is used to cover both the infant's nose and mouth. However, small puffs of air are blown into the infant. Large breaths under force could rupture the infant's lungs. The breathing of an infant is more rapid and should be at the rate of about 20 breaths per minute or one every three seconds.

Sometimes, rescue breathing is needed for a long period of time. The effort should be continued until help arrives. If the rescuer gets tired, he or she can alternate with another person.

The first sign of restored breathing may be a sigh or a gasp. Breathing may be irregular at first; therefore, rescue breathing should be continued until the victim's breathing is spontaneous and fairly regular. When normal breathing resumes, the person usually recovers rapidly; however, he or she should be observed carefully, and the rescuer should be prepared to start rescue breathing again if the injured person stops breathing.

Drowning

When a drowning person is removed from the water, he or she should be turned on the stomach so that any water in the upper respiratory tract can be quickly drained out. The mouth should be quickly checked to ensure that no material remains to obstruct the upper airway. When these two things are done, rescue breathing should be administered, as previously described. Rescue breathing may need to be carried out for as long as an hour or two. A first aider should not get discouraged if the person does not begin to breathe right away.

Sucking Chest Wounds

Sign	*Action*
• Gaping hole in chest	• Cover hole with plastic or some other material that air will not penetrate. • Cover hole at the time the person has breathed out so that the next breath will pull air into the lungs instead of into the hole.

In some cases of violent injury to the chest, a hole is made that permits air to flow in and out of the chest cavity when respirations occur. When this happens, the lungs cannot correctly fill with air, and the victim may have serious breathing difficulties. The treatment for

this is to cover the hole at the time the victim has breathed out. The hole can be covered with the hand; with a piece of plastic, such as a sandwich bag; or with some other impervious material through which air will not pass. This hole should be kept covered to prevent air from leaking into the chest cavity. Obtain medical treatment as quickly as possible (Fig. 12).

Fig. 12. Covering sucking-type chest wound

Asthma

Asthma can come on quickly and can be quite severe. In typical asthma, the person seems to be able to inhale, but is unable to exhale air from the chest. With the air trapped in his or her lungs, the victim is unable to breathe in and out effectively. This can be a frightening thing, both to the victim and to the first aider. Anxiety aggravates the problem.

Let the person sit in the most comfortable position he or she can find. Transport the person to a doctor or to a medical facility as quickly as possible. If the person has a nebulizer or atomizer medication, assist him or her in using it. If he or she has medication, assist him or her in taking it.

Allergic Reactions

Some allergic reactions cause swelling of the lip, tongue, and throat. Some of these allergic reactions can be extremely serious and can result in loss of life if swift action is not taken. A person developing such swelling should be taken immediately to where he or she can receive medical care. Bee stings sometimes cause this allergic condition to occur. People who know they are subject to an allergic reac-

tion sometimes carry a syringe of medicine with them for administration in the event of such an emergency.

Emotional Problems That Affect Breathing

Sometimes, young people, especially when they become very anxious or nervous, think that they are having trouble breathing. Frequently, they complain that they cannot get enough air into their lungs. Their respiration may be sighing in nature.

The most appropriate action for this condition is to reassure the person. A person with such a problem is not in any danger as long as he or she is moving air in and out of the lungs.

Overbreathing or Hyperventilation

People who are inclined to have emotional problems that affect breathing also may have what is called the hyperventilation syndrome (overbreathing). Because they feel they cannot get enough air, they breathe too much air or hyperventilate. This hyperventilation changes body chemistry and may cause cramps or spasms to occur in the hands and feet. It may also be accompanied by feelings of numbness around the mouth and face and an emotional feeling of great anxiety.

The most appropriate action to take in hyperventilation cases is to reassure the victim and have him or her hold his or her breath. If the person has been observed breathing rapidly and has developed stiffness and spasms of the muscles of the hands, having the person breathe for two minutes into a paper bag will relieve this condition.

Pain in the Chest

Pains in the chest can affect breathing, and anyone whose breathing is affected by such pains should be examined by a physician. Pains in the chest that affect breathing may be caused by a number of conditions: collapsed lungs, fractured ribs, irritated nerves, muscle spasms, blood clots in the lung, heart trouble, or infection. Only a physician can differentiate between these various conditions and give the proper treatment. Any person having pain in the chest that affects breathing should be examined by a physician immediately.

V
Skeletal Injuries and Disorders

Injuries to muscles, bones, and joints are common in children. Correct first aid care can reduce pain, prevent aggravation of injury, and speed recovery.

Cramps

Muscle cramps occur suddenly and can be extremely painful, especially when they occur in a large muscle. Such a cramp may be brought on by a blow to a muscle or come after strenuous exertion. This is sometimes referred to as a "charley horse."

Sign and symptom of cramps. Involuntary contraction (spasm) of a muscle is sometimes associated with a knot that can be seen or felt.

Methods of care of cramps. Methods of care for muscle spasm or cramps include gentle massage; stretching of the muscle by gently moving the affected part so that the cramped muscle is gently stretched; and heat, especially moist heat (hot, wet towels) if available. If heat is used, great care must be taken not to burn the person.

Pulled Muscles or Strains

A "pulled muscle" is a muscle that has been overstretched or that has contracted with such force that some of the muscle fibers have torn. A pulled muscle can be very painful. When this muscle strain first occurs, a small amount of bleeding may occur in the muscle.

Signs and symptoms of pulled muscles. Localized pain, muscle spasm, and stiffness over a muscle that has just undergone strenuous exercise or that has been used in lifting are indications of pulled muscles or strains.

Method of care of pulled muscles. Immediately after and continuing during the first four hours after the injury, cold should be applied to reduce bleeding into the muscle and to reduce irritation and spasm. However, after eight hours, heat should be applied to aid the healing process.

Sprains

Sprains refer to the stretching or tearing of the tough fibrous bands of tissue (ligaments) that hold joints together. The most common place for this injury to occur is the ankle, but such an injury can occur in the knee, wrist, elbow, finger, or in any other joint. A bad sprain can be as serious as a broken bone. The correct care given immediately after the injury can prevent much pain and can also shorten the period of disability.

Signs and symptoms of sprains. Immediate pain and rapid swelling usually occur after a sprain. Sometimes discoloration appears early as a result of blood vessels' being torn. Discoloration almost always occurs after several days.

Method of care of sprains. Methods of care of sprains include immediately elevating the part above the level of the heart, with the person lying down and the injured part raised; immediately applying cold and continuing to apply cold for two or three hours; and preventing the person from bearing weight on the joint if the joint involved is in the lower extremity. The person should not bear weight on an injured joint until a medical evaluation is made. In the upper extremity a sling should be used to help make the person more comfortable.

A person's ability to move an injured limb does not necessarily mean that he or she has not broken a bone.

Fractures

Any break in a bone is called a fracture. Often, fractures occur with severe sprains. In many fractures even a doctor cannot be sure a bone has been broken until he or she takes an X ray. For this reason any severe injury that has applied great force to a bone should be considered as having caused a fracture until a health professional determines otherwise.

Examination of the Spine

To check for injuries to the spine, a first aider should run a hand under the person, along the full length of the spine, noting particularly any areas of swelling, tenderness, tight back muscles (muscles in spasm), or deformity. The victim should not be moved during this check. If any of these conditions is present, the person should be cared for as if he or she had a spinal injury. (See Chapter VI on spinal injuries.)

Examination of the Extremities

If the injured person is conscious, he or she should be asked to move his or her arms and legs and to indicate where pain is present. In feeling the arms and legs, the first aider should exercise special care

in feeling areas that are painful. With a fresh fracture numbness may be present; and if so, a great deal of pain may not be felt by the injured person. Therefore, the arms and legs should be carefully examined when the person has been subjected to some violent force. Gently feeling the bones of the arms and legs, the first aider should note whether tenderness, swelling, or abnormal motion is present. If any of these conditions is present, the person should be treated as if he or she had a fracture. The fact that a person can move an extremity does not mean that a bone is not broken.

Kinds of Fractures

There are several different kinds of fractures:

1. A break or crack in the bone, without displacement of the bone fragments (green stick).
2. A single break in which the bone is angulated or the ends separated (simple fracture).
3. Multiple breaks in the same bone (comminuted fracture).
4. A broken bone with a communicating wound to the skin (compound fracture). The end of the bone may be protruding through the skin (Fig. 13).

Signs and Symptoms of Fractures

The injured person should be examined carefully for the following signs and symptoms of fracture:

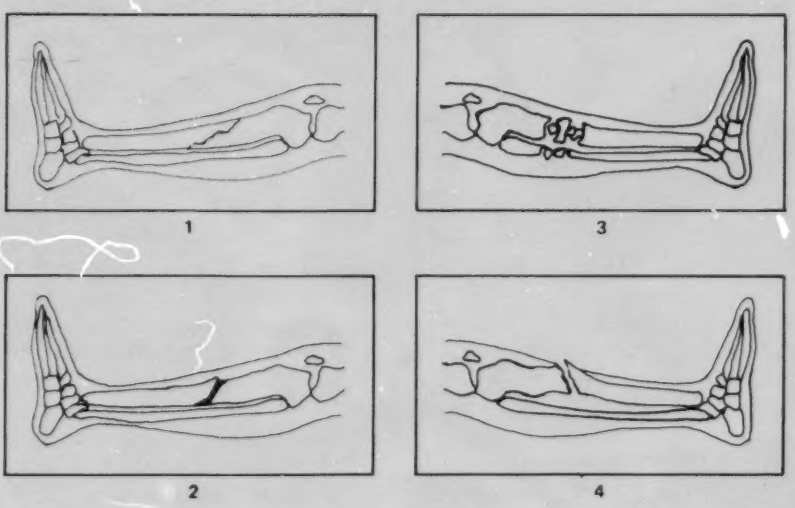


Fig. 13. Kinds of bone fractures

1. *Pain.* Pain may or may not be present immediately. Frequently after a fracture, numbness occurs and may last 30 minutes or more.
2. *Tenderness.* Pressure over the site of the break may produce pain.
3. *Swelling.* Swelling may or may not be apparent. Immediately after a break, there may be no swelling at all.
4. *Deformity.* The first aider may notice that the bones are not as straight as they should be, or that the injured part may be twisted or shorter than normal. By running a finger along a bone that is near the surface, the first aider may detect an area of irregularity.

Methods of Caring for Fractures

In accidents that cause fractures, other injuries are likely to be present. Therefore, if other injuries seem a possibility, the first aider should assess the situation, as described in Chapter I:

1. If the victim is unconscious, check for breathing and heartbeat.
2. Check for bleeding. If bleeding is present, control it before proceeding with treatment of the fracture.
3. Treat for shock. Some degree of shock is present in all cases of fracture. Having a person with a fracture lie down may prevent fainting, falling, and further injury.

Splinting of fractures. Ambulance attendants, law enforcement officers, and fire department personnel have had special training in the splinting of fractures. Splinting of fractured bones should be left to one of them if they are immediately available.

Fractures should be splinted before the injured person is moved. The only exception to this rule is when the injured person's life is in extreme danger, such as in a fire.

Ankle or wrist fractures. Fractures that are not more than 1 inch (about 2.5 centimetres) above the wrist or ankle may be splinted with a splint that runs from the fingers to the elbow or from the foot to the knee (Fig. 14).

Leg and forearm fractures. Splinting of a fracture below the elbow or below the knee can be done with a piece of any rigid material that will extend from the tip of the fingers to the armpit or from the toes to the groin. The material should be padded, if possible, with clothing, towels, or some other cloth. Then the material should be snugly secured by ties, but care should be taken to prevent putting a tie over the fracture site (Fig. 14).

Thigh fractures. Fractures of the thigh can be splinted best with a traction splint; but in the absence of anyone skilled in applying a

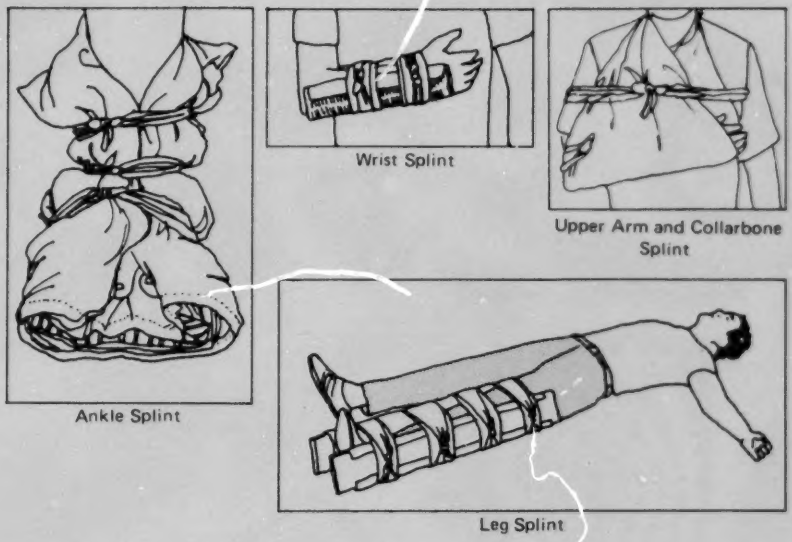


Fig. 14. Splinting of ankle, wrist, arm, and leg fractures

traction splint, the person's whole body should be immobilized on a rigid stretcher, a piece of plywood, a door, or some similar material with a rigid, flat surface that has been padded to make it more comfortable. Such a procedure will provide adequate immobilization of the fracture. If a flat, rigid material is not available for immobilizing the body, then two padded boards can be used to splint the leg: one on the inside of the leg extending from the foot to the groin and one on the outside of the leg extending from the foot to the armpit. These boards should be well padded and tied securely in place (Fig. 15).

Upper arm fractures. When the upper arm is fractured, the arm may be bound to the chest and immobilized (Fig. 14).

Collarbone fractures. Splinting of fractures of the collarbone may be done in a manner similar to splinting of the upper arm (Fig. 14).

Elbow and knee fractures. Fractures involving elbows and knees should be splinted in the position in which they are found after the accident. A first aider should not try to straighten or move members with such breaks, because in doing so, the first aider could aggravate such injuries.

Hip fractures. When an elderly person falls, it should be assumed that the hip has been fractured until an X ray proves otherwise. A fractured hip can be splinted by using a rigid stretcher in a manner similar to that used for a fractured thigh (Fig. 15).

Open or compound fractures. Open or compound fractures should be splinted as they are found after the injury, if possible. If a fractured bone is protruding through the skin, it should be covered with a clean dressing, held in place with a bandage, and then splinted (Fig. 16).

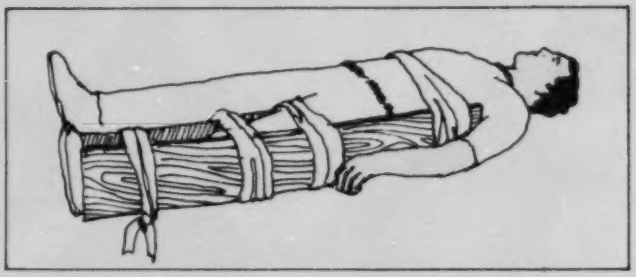


Fig. 15. Splinting of thigh and hip fractures

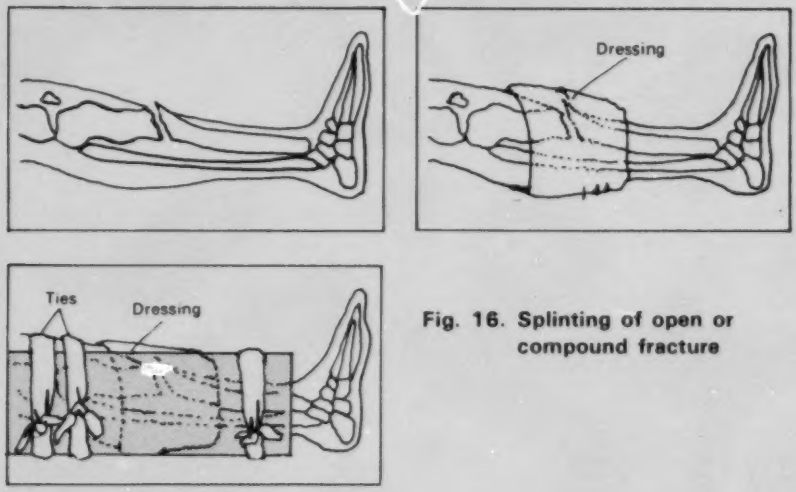


Fig. 16. Splinting of open or compound fracture

VI
Spinal Injuries

Injuries to the spine (backbone) are among the most serious a person can sustain. All movements of the body and many of the functions of the vital organs are controlled by nerves running from the brain through the spinal cord to the various parts of the body. The spinal cord runs through a narrow bony canal in the backbone (spine). When the spine is dislocated or broken, the canal through which the spinal cord passes is disrupted, and the spinal cord may be severed or so severely compressed that the nerves cease to function, resulting in paralysis. The part of the spine in the neck (cervical spine) is particularly important, because the cervical spine is not as strong or as well protected as the rest of the spine. Because of the cervical spine's location near the brain, injury to the cervical spine will affect all functions that the spinal cord performs below the level of the injury. A break high on the cervical spine can affect breathing, and this is one reason people die from a broken neck.

Incorrect care of a person with this kind of injury can cause his or her death, while immediate correct care may not only save his or her life but also may prevent him or her from becoming permanently paralyzed. The first aider should always suspect a neck injury if an injured person is unconscious from an unknown cause, has been in an accident subjecting him or her to violent force, or has injuries to the face or head, even if no signs or symptoms of spinal injury are present.

After determining the injured person's level of consciousness, the first aider should gently feel the neck bones in the back of the person's neck for irregularities or pain. If the injured person is conscious, the person should be asked to move his or her arms and legs to determine whether he or she has paralysis. Also, the first aider should examine the arms and legs to see whether feeling is present. If the victim has numbness or loss of feeling in either arms or legs, if he or she has pain in the back of the neck, or if any irregularity of the neckbones is detected, extreme care should be taken in any further evaluation or treatment of this victim. However, even though a person may not show any signs of a neck or spinal injury, if that person has been

subjected to any violent forces, he or she should be treated as if there were a neck injury. Such forces could include an automobile accident, a bad fall, and so forth. Unconsciousness or injuries to the face, the head, or the neck should be taken as indications of injury resulting from some violent force.

Signs and Symptoms of Injury to the Spinal Cord

Signs and symptoms of injury to the spinal cord are the following:

1. Numbness and tingling of arms, legs, fingers, or toes
2. Paralysis or inability to move any one, or all, of the extremities
3. Pain in the region of the injury
4. Loss or decrease of sensation of pain below the location of the injury

Methods of Caring for Persons with Spinal Injuries

The following procedures must be observed very carefully in caring for spinal injury victims to prevent further injury and possibly even death:

1. Do not move the injured person until trained medical help arrives unless the injured person's life is in immediate danger from fire, drowning, traffic hazard, and so forth.
2. Make a splint for the neck if it is absolutely essential to move a person with a neck injury to protect his or her life; for example, if he or she is in a wrecked car and spilled gasoline is likely to ignite. The neck can be splinted by taking a suit coat, medium weight jacket, heavy shirt, or heavy bath towel and rolling it into a cylindrical shape. If a jacket or coat is used, the pockets must be emptied. Then while one person exerts gentle traction on the neck, keeping the head motionless and in direct alignment with the spine, another person carefully and gently slips the rolled-up coat or jacket behind the injured person's neck and brings the ends together under the chin, holding the material in place by means of a belt, string, or tape (Fig. 17).

   The first aider must make sure that he or she does not interfere with the injured person's breathing. While someone continues to exert slight traction on the injured person's neck, holding the head motionless and in direct line with the body, the injured person can be moved. If a wide board is available, the board should be slipped behind the person and extended from the lower back to the top of the head, and then his or her head and body can be secured to the board by means of tape. Caution must be taken to ensure that the head and body are moved only as a unit.

3. Make a splint for the spine if a person with a back injury must be moved. However, a person with a back injury—and with a suspected spinal cord injury—should not be moved until professional help is available, unless his or her life is in immediate danger.

   In cases where a person with a back or spinal cord injury must be moved, a piece of plywood or a board, at least as wide as the injured person's shoulders and hips, should be used as a splint. The board should be as long as the injured person, and the injured person should be securely tied to the splint to prevent his or her sliding or falling off. The tying can be done with tape, bandages, or belts joined together (Fig. 18).

Fig. 17. Splinting of neck

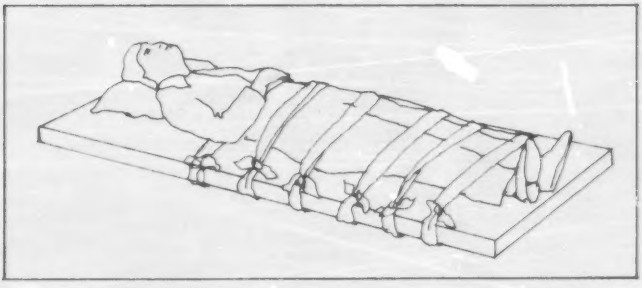


Fig. 18. Splinting spine of victim of back injury

VII
Injuries to the Head and Special Organs

Injuries to the head and to special organs, such as the eyes, ears, and teeth, require special care.

Head injuries are difficult to evaluate, even for the physician; therefore, certain basic principles must be followed. Observing these basic principles can help the physician with his or her assessment of the injured person later on.

Principles to Be Followed with Head Injuries

If a person has head injuries, the following questions should be asked and adequate answers sought:

1. Cause of the accident. How did the accident happen?
2. Magnitude and kind of force of the accident. How great was the force, and what kind of force was involved? What was the distance of fall or the size and speed of the object hitting the head?
3. Behavior immediately after the accident. Did the injured person lose consciousness? Was the injured person dazed? If so, for how long?
4. Loss of consciousness. Did he or she lose consciousness initially, regain consciousness, and then lose consciousness again?
5. Vomiting and bleeding. Did the injured person vomit, or did he or she bleed from the nose or ears?
6. Examination of the eyes. Are the pupils of the eyes equal in size? What size are the pupils (Fig. 19)? Does a subsequent examination reveal a change in the size of the pupils?
7. Examination for seizures. Did the injured person have a convulsion or get stiff?

Actions to Be Taken with Head Injuries

The following actions must be taken in the case of head injury to prevent further injury and to get the injured person to adequate medical care as soon as possible:

1. Check and maintain breathing by making sure the person has a clear airway. (See Chapter IV, "Breathing and Airway Maintenance," p. 17.)
2. Control bleeding. (See Chapter III, "Wounds, Bleeding, and Bruises," p. 13.)
3. Check for other injuries.
4. Rapid transportation to professional medical care is essential. The location of the accident and the urgency of the situation should be considered in determining the kind of transportation to be used.
5. An injured person should be moved by trained emergency personnel; but if the injured person must be moved immediately and trained emergency personnel are not available, then splint the neck so that the head and body move as a single unit, which will protect the neck.
6. Note the times that the pupils of the eyes are examined and their relative sizes. This information and knowledge of whether the pupils are of equal or unequal size can be of great value to a physician in determining the progress of the injury.

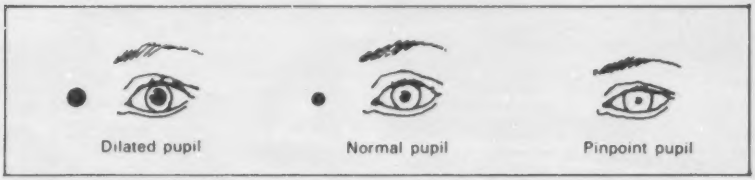
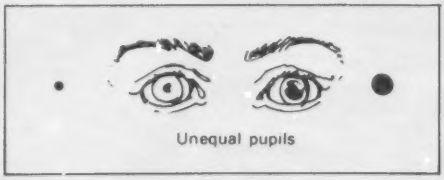


Fig. 19. Examining pupils of the eye of injured person



Eye Injuries

The eyes obviously are extremely important special organs, and correct care in the event of an emergency involving the eyes may prevent serious impairment of vision or even blindness. Therefore, careful and prompt medical attention should be given to anyone sustaining an injury to his or her eyes.

Blows to the eyes. Injuries caused by blows to the eyes may be caused by a fist, a ball, a bat, an elbow, or by a person's running into something or being thrown against something. Eye injuries caused by

such blows are potentially quite serious. The bones of the orbit of the eye may be fractured from the blows, or blood vessels within the eye globe itself may be broken, causing hemorrhage into the eyeball.

Signs and symptoms of eye injury from blows. Evidence of injury to the eyes includes bruises around the eye, cuts, swelling of the lids, or dilation of the pupil on the injured side to a much larger size than the pupil on the uninjured side. When dilation is detected in an unconscious person, the first aider should suspect a serious head injury. In a conscious person with no other evidence of head injury, the most likely cause of dilation of the pupil in one eye is a direct blow to the eye.

Actions for blow-type injuries to the eye. For blow-type injuries to the eyes, general body rest is necessary to prevent bleeding into the eyeball. The injured person should be encouraged to lie down, and cold applications should be applied to the eye. The injured person should be transported immediately in a lying position to a medical facility where an evaluation can be made.

Lacerations of the eye. Sometimes, objects, such as glass, wire, and knives, may be forced into the eye accidentally. The first aider should make no attempt to remove the foreign object. Rather, the object should be immobilized, if possible, by the wrapping of voluminous bandages around it and the eye to prevent further movement of the object in relation to the eyeball. Both eyes must be bandaged to prevent motion of the injured eye. The injured person should be transported immediately in a lying position to the nearest medical facility where this condition can be treated professionally (Fig. 20).

Scratches and cuts of the eye. Often, the cornea (clear part of the eye) becomes scratched or cut by such things as a fingernail, a branch from a tree, or some other foreign object. Severe pain of the eye, spasm of the lids, and reddening of the eye are signs and symptoms of scratches or cuts of the cornea.

Fig. 20. Bandaging for laceration of eyes

Actions for scratches or cuts of the cornea. If the injury to the eye appears to be severe, the eyes should be bandaged. No attempt should be made by the first aider to examine or treat the eye. The injured person should be transported as rapidly as possible to the closest medical facility for professional evaluation and treatment.

Small foreign bodies in the eye. Specks of dust, eyelashes, and similar small particles can easily get into the eye. Reddening of the eye, tearing, and spasm of the lids are signs of the presence of small foreign bodies in the eye.

Actions for removing small foreign bodies from the eye. The first aider may appropriately irrigate the eye in an attempt to wash out the speck of dust or other small foreign body. This irrigating of the eye may be done by having the affected person hold his or her head back, with the body in a sitting or lying position, and by pouring clean cool water into the eye while holding the eyelids apart. The irrigating procedure may be done several times, and it may be very effective in removing a small foreign body. (A towel or similar item can be wrapped around the victim's neck to keep his or her clothes dry.) Another method of removing a foreign particle from the eye is to grasp the eyelashes of the upper lid between the thumb and forefinger, pull the upper lid out, and bring it down over the lower lid. The lower eyelashes will sometimes sweep out a small foreign body that is lodged under the upper lid.

Still another method is to place a matchstick or similar rigid object at the base of the upper lid; grasp the upper eyelashes and pull the lid out, gently pushing down on the matchstick and inverting the lid; and brush the foreign body out of the eye with a *moistened* cotton-tipped applicator or with the corner of a piece of tissue (Fig. 21). This procedure should be done very gently; and if it is not successful, the affected individual should be examined by a medical practitioner to have his or her condition evaluated and treated.

Chemicals in the eye. Chemicals in the eye are extremely dangerous and must be removed immediately. The best treatment for chemicals in the eye is to wash or irrigate the eye with large amounts of water as quickly as possible. The washing can be done with clean water or with milk if clean water is not available. Following profuse irrigation of the eye for three or four minutes, the first aider should place a bandage over the eye and have the affected person transported immediately to a medical facility where he or she can receive professional medical attention (Fig. 22).

Ear Injuries

Injuries to the eardrum frequently occur from sharp objects', such as a toothpick or a hairpin, being pushed into the external ear canal.

Fig. 21. Removing small foreign bodies from eye

Fig. 22. Performing profuse irrigation of eye for chemical removal

Also, diving in deep water can burst the eardrum because of the great pressure.

Signs and symptoms of ear injury. Signs and symptoms of ear injury are the following:

1. Pain in the affected ear
2. Possible bleeding from the affected ear
3. Possible loss of hearing in the affected ear
4. Sometimes, ringing in the ears

Action to take for ear injury. The first aider should place a dressing over the ear to increase the victim's comfort while the victim is being transported to a medical facility for evaluation and professional treatment. The first aider should give no other treatment nor take any other action. Do not put any drops in the ear if acute injury is suspected.

Insects in the ear. Occasionally, a small insect may find its way into a person's ear. An insect in the ear can be very uncomfortable and with small children can cause panic.

Symptoms of insects in the ear. The symptoms of insects caught in the ear are as follows:

1. Buzzing and tickling sensations
2. Occasional pain

Actions to take for insects in the ear. A first aider can place a drop of oil in the ear of the affected person to stop the buzzing sensation. The oil to use for this purpose can be olive oil, mineral oil, or vegetable oil as used in cooking. If none of these types of oil is available, a small amount of water or milk may be used to accomplish the same thing. Following this emergency treatment, the individual should be taken to a medical facility where the insect can be removed from the ear by a medical doctor.

Nosebleeds

Nosebleeds frequently occur with children and may be caused by a blow to the nose or by the child's picking his or her nose. Nosebleeds also may occur spontaneously without apparent cause. Nosebleeds can be frightening to a child; however, the first aider may sometimes stop nosebleeds by following some very simple procedures.

Actions for stopping nosebleeds. Bleeding generally occurs from small blood vessels that are under the soft part of the end of the nose, and so the first aider can generally stop the bleeding effectively by using the following procedure:

1. Have the child blow his or her nose vigorously to clean out the mucus and blood clots.
2. Grasp the soft part of the nose, and compress it firmly.
3. Maintain the pressure for ten minutes, timed by a watch or clock, without releasing it. If the pressure is released before the ten minutes are up, bleeding is likely to recur, and the whole procedure must be repeated from the beginning. *NOTE:* As long as firm pressure is maintained, the child may spit during this procedure.
4. Permit the child to relax in a sitting or semisitting position and remain quiet. The child should not be permitted to lie down flat, because lying down may cause blood and mucus to drain back into the throat and cause gagging or discomfort.

The application of cold to the back of the neck and the sucking of ice chips are sometimes helpful in stopping nosebleeds.

Broken Nose

A heavy blow to the face may break bones in the nose. Such a blow may be caused by a fist, a baseball bat, a ball, or by a child's striking his or her nose on some object with force.

Signs and symptoms of a broken nose. Signs and symptoms of a broken nose are crookedness, swelling, bleeding, and possibly numbness for a brief period following the onset of the injury.

Actions to take for a broken nose. For a broken nose the first aider should do the following:

1. Apply cold compresses to the nose immediately to reduce the swelling.
2. Transport the injured person immediately to a medical facility for medical evaluation and treatment.

If the injured person is examined by a physician immediately following the occurrence of such an injury, a degree of numbness may be present, and straightening the nose may be considerably easier for the physician. A broken nose may not appear to be a serious injury; however, for the comfort of the patient, immediate medical attention is desirable.

Lip Injury

Lips are frequently injured in fights, falls, accidents in athletic events, and in other types of accidents. Frequently, teeth are driven through the lip as a result of an accident.

Signs of lip injury. Signs of lip injury are swelling, bleeding, and cuts either on the inside or outside of the lip.

Actions to take for lip injury. Immediate application of cold is helpful in controlling swelling and bleeding. The injured person should be transported to a medical facility for examination and treatment as soon as possible. Stitching of the lacerations may be necessary. The injured person may rinse his or her mouth with clean water, if desired.

Tooth Injury and Toothache

Teeth are frequently chipped, broken, or knocked out in accidents. Teeth that are completely knocked out should be saved, wrapped in a clean wet tissue or piece of wet cloth, and taken to the dentist who is to treat the injured child. Teeth that are broken off can become extremely painful, and a person with a broken tooth should have an immediate dental evaluation and treatment. Loose teeth and teeth driven up into the gums also need immediate dental evaluation and treatment. No special first-aid treatment should be given for these injuries involving the teeth.

A severe toothache can occur when a person has dental disease. Such a toothache may occur from a person's biting on something hard, such as a piece of hard candy, or by exposure to extreme cold. A toothache also may occur spontaneously without any apparent cause.

Usually, nothing can be done for a toothache except to have the child rinse his or her mouth with warm water and keep his or her mouth closed to prevent cold air from striking the sensitive area of the tooth. The first aider should transport the child to a dentist for further evaluation and treatment.

Tongue Injuries

The tongue is most frequently injured by being bitten as the result of an accident. Sometimes, an accident can cause the teeth to be driven through the tongue. A moderate amount of bleeding from an injury to the tongue may occur; but generally such injuries are not extremely serious, and they heal quickly. However, if the tongue is cut severely by the teeth or by any other object, the injured person should have an immediate evaluation by a physician, since occasionally such lacerations need to be sewn up. Cold applied to the tongue in the form of ice chips can be helpful in making the victim more comfortable.

Breast Injuries

Sometimes, girls suffer blows to the breast that cause severe bruises. Such an injury may cause them great concern and considerable pain. The immediate signs and symptoms are pain, swelling, discoloration, and the feeling of a lump in the breast. The first aider should apply cold and transport the injured person to a medical facility for evaluation by a health professional. An examination of the breast is not necessary for effective first-aid care.

Genital Organ Injuries

Boys are frequently injured by being hit or kicked in the testicles, or they sometimes fall astride something, causing bruising of the genitals. This kind of injury can be extremely painful. Initial supportive treatment may bring a great deal of relief.

Signs and symptoms of injury to genital organs. Signs and symptoms of injury of the genital organs are excruciating pain, swelling, and possible discoloration from bruises.

Action to take for injury to genital organs. The discomfort experienced by a boy who suffers injury of the genital organs is greatly decreased through the application of cold and through support to the injured area. Support may be accomplished by having the injured boy

hold the affected area with his hand or by stuffing a T-shirt or similar piece of clothing in his pants and under his testicles.

Girls may be injured also in the genital area, and the treatment is the same as for any other bruise, namely, the application of cold. Examination of the genital area by the first aider is generally not necessary to render effective immediate care following the injury.

VIII
Transportation of the Sick and Injured

Excellent emergency care can be given at the site of the injury, and the victim could still end up in the hospital with injuries worse than he or she sustained initially, because he or she was moved incorrectly. This situation can be especially true of persons with fractures. Incorrect handling and transporting can cause a simple fracture to become a compound fracture, or someone with a spinal cord injury could become paralyzed.

Evaluation of the Situation

The following procedures should be adhered to carefully in determining the type of transportation to be used to move sick and injured persons to professional medical help:

1. Evaluate the urgency for transportation. A person who is not bleeding, who is not in shock, and who does not have any other life-threatening illness or injury can wait for ideal transportation if necessary.
2. Determine the most readily available, most practical, and safest transportation. If there is an apparent urgency to get the injured person to professional medical help quickly, the most readily available, most practical, and safest transportation may have to be used.

Principles Involved in Transporting the Sick and Injured

In the transportation of sick and injured persons, the following principles should be observed carefully:

1. Seriously injured people may faint and should be transported lying down.
2. Unconscious people are likely to vomit and must be watched closely, because they can choke to death on their own vomit. They should be transported on their sides if their other injuries do not indicate that this position would be unwise or impractical.
3. Injured persons who have fractures of the ankle or the wrist can be transported in a sitting position if necessary. However, if the

injury is an akle fracture, the foot should be elevated so that the knee is straight and the foot does not hang down. If the injury is a fractured wrist, a splint and a sling will make the injured person more comfortable.

4. Injured persons with other types of fractures should be transported lying down.
5. People with certain conditions are usually more comfortable sitting up and may be transported in a sitting position unless they are unconscious. These conditions include nosebleeds, face injuries, heart trouble, and asthma. Facial injuries include injuries to the mouth, teeth, and/or nose, from which blood and secretions may accumulate in the mouth and throat. If the injured person is unconscious, he or she should be transported lying on his or her side. If a neck injury is suspected, the first aider should ensure that the neck is adequately splinted. People with heart trouble or asthma who are having a hard time breathing usually can breathe better in a sitting or semisitting position.

Methods of Transporting Sick and Injured Persons

If a sick or injured person is to be transported sitting up, a two-person chair carry may be used to put him or her in the vehicle (Fig. 23).

If the sick or injured person is to be transported lying down, a five-person or six-person lift and carry is recommended. One person is to manage the injured person's head, keeping it steady and in line with the body while the person is being carried. Transporting a child is less difficult than transporting an adult, but the principles are the same (Fig. 24).

Fig. 23. Transporting victim, using two-person chair carry

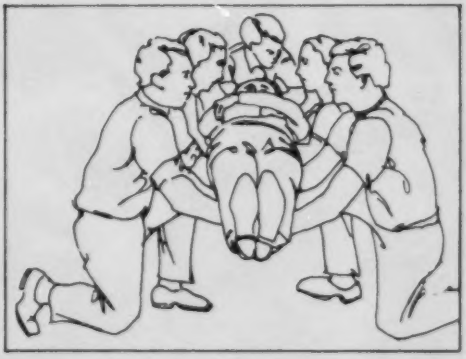


Fig. 24. Transporting injured child, using five-person lift

Fashioning of Litters

A litter can be made from a door, a piece of heavy plywood, or some other rigid material that is as wide as the person at the hips and shoulders and that extends some distance above the head and below the feet. Before transporting the injured person, the first aider should make a smooth pad on the litter with a blanket or with clothing to make the victim more comfortable. A blanket litter can be made by rolling a blanket on two poles as illustrated (Fig. 25).

If the person is going to be transported on the floor of a bus because of unavailability of more appropriate transportation, a cushion of clothing at least 3 inches (about 7.5 centimetres) thick should be placed under the person, and someone should be stationed at the victim's head at all times to observe him or her and care for his or her needs.

If the injured person is transported lying on the back seat of a bus, someone should be stationed in the aisle directly in front of the person to prevent him or her from falling off the seat in the event of a sudden stop. The bus driver should use great care to avoid sudden stops.

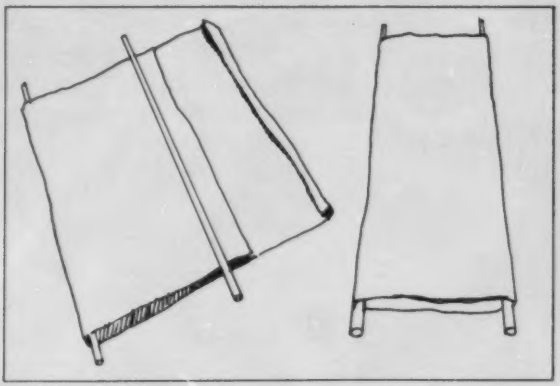


Fig. 25. Making litter with blanket and poles

IX
Unconsciousness, Fainting and Convulsions

Although a first aider does not have to know the causes of unconsciousness to render effective first-aid care, a general idea of the major causes of unconsciousness may be of some help in his or her understanding the problem.

Causes of Unconsciousness

The following are considered the "mechanical causes" of unconsciousness:

1. Increased pressure in the skull from swelling of the brain or from bleeding into the skull. This condition can develop following an injury or a stroke.
2. Diminished blood supply and/or lack of oxygen to the brain. This condition can develop from shock, drowning, or other factors that interfere with respiration.
3. Depression of the centers of consciousness of the brain by drugs or poisons.
4. Emotional unconsciousness (not true unconsciousness).

General Treatment of Unconsciousness

The following procedure should be adhered to in rendering first aid to unconscious persons: The unconscious person should be placed in a prone position, and tight clothing (such as tie or collar) about the neck and chest should be loosened. The first aider should check breathing and should maintain an open airway. If the unconscious person is not breathing, rescue breathing should be started at once. If the person is breathing, he or she should be kept lying down on his or her side, with a pillow, a folded blanket, or an article of clothing placed under his or her head. The injured person should be watched for vomiting and should be given no fluids or food.

Anyone who loses consciousness should have a medical evaluation, and anyone who is unconscious for more than two minutes may be in need of urgent transportation to a medical facility for a medical evaluation.

Causes of Fainting

Fainting is usually caused by a brief temporary drop in blood pressure that deprives the brain of blood supply and oxygen necessary for maintaining consciousness. In cases of fainting the person should be lowered to a horizontal position, and consciousness should return very quickly.

Fainting can be caused by emotional problems also. The treatment is the same general treatment already mentioned, and the first aider should not try to differentiate between the different types of fainting. Fainting from emotional causes may last longer than that caused by physiological problems.

Signs of fainting. The signs of fainting are dizziness, lightheadedness, and buzzing in ears.

Action to be taken for fainting. A person who is dizzy, lightheaded, or has buzzing in the ears should lie down if possible; if lying down is not possible, he or she should place his or her head between the knees until the symptoms subside.

Causes of Convulsions

Convulsions are caused by irritating impulses that spread over the brain, stimulating the centers that control the muscles. The impulses that cause convulsions can arise from several sources: epilepsy, diabetes (too much insulin), toxicity, head injury, and emotions.

Epilepsy. The person with epilepsy usually has a history of prior convulsions, and the person may be carrying medicine for this condition. If the person has no history of convulsions, the need for an immediate medical evaluation is indicated.

Actions to be taken in the case of epilepsy are the following:

1. Do not restrict movement.
2. Prevent possible further injury by removing objects that the person might strike.
3. Loosen restrictive clothing.
4. Let the convulsion run its course.
5. Place a padded stick between the person's teeth if this can be done easily. Do not try to force the jaws open, and do not push the stick past the teeth; doing so could push the tongue back in the throat where it could interfere with the victim's breathing.

Diabetic with low blood sugar. Diabetics who take too much insulin for the amount of food they have eaten may develop low blood sugar, lose consciousness, and have convulsions.

Signs and symptoms of a diabetic with low blood sugar are as follows: Prior to lapsing into unconsciousness, a diabetic may feel weak, may act dazed, and may try to eat a piece of candy.

Actions to be taken are as follows: If the victim is still conscious, the first aider should give candy, fruit juice, soda pop (not the diet kind), or coffee or tea with a lot of sugar. If the victim has lost consciousness, the first aider should give nothing by mouth and should transport the victim at once to a facility that gives medical care.

Toxic conditions. Convulsions can be caused by fever, poisons, drugs, or alcohol. The actions to be taken are the same as for epilepsy.

Head injury. Occasionally, convulsions occur following a head injury. The actions to be taken in treatment of convulsions caused by head injury are the same as for epilepsy. (For care of head injury, see Chapter VII.)

Emotional causes. Occasionally, one sees behavior that is emotional in origin and that stimulates convulsions. Even though these are not true convulsions, a medical evaluation is still needed.

X
Shock

Shock is a condition that affects the circulation. When a person is in shock, the blood does not circulate correctly through the body, and, therefore, the brain and other vital organs do not receive sufficient oxygen supply. The poorer the circulation, the greater the degree of shock.

Causes of Shock

Shock can be caused by several different things:

1. Loss of blood—Blood volume in the body is reduced through injuries that cause excessive bleeding either internally or externally. The blood volume becomes insufficient to circulate through the body and to the brain carrying enough vitally needed oxygen. As a consequence, shock develops. Internal injuries may cause bleeding either in the chest or into the abdominal cavity. Thus, the internal bleeding reduces the effective amount of blood available to circulate to the brain and may cause severe shock.
2. Breaking of the femur—The breaking of the femur (thigh bone) frequently causes severe shock because of pain and the tearing of the blood vessels. Tearing of the blood vessels near the broken bone can cause a large amount of bleeding into the muscle.
3. Pain—Great pain can cause shock by disturbing the circulation and causing blood to pool in the abdomen. This pooling of blood reduces the amount of blood that is effectively circulated through the system.
4. Emotional causes—The same type of blood-pooling condition can also arise from emotional shock. Emotional shock can occur from seeing a bad accident, seeing a quantity of blood, or hearing bad news. Emotional shock can cause a condition similar to that which develops from great pain by impairing the circulation of the blood to the brain, resulting in varying degrees of shock.

Shock is a serious condition that may result in death. Shock is easier to prevent than it is to treat. Therefore, conditions that are present and that may cause shock should be evaluated as to their possible effect on the individual exposed. Treatment for shock should be instituted immediately, even though the signs and symptoms may not have occurred. By taking such immediate action, the first aider can sometimes prevent shock or considerably reduce its effect. The person sustaining a major injury, even though he or she does not show signs of shock, should be treated for shock to prevent shock from developing.

Signs and Symptoms of Shock

The signs and symptoms of shock are the following (Fig. 26):

1. Cool, clammy skin, forehead, chest, or limbs
2. Pale skin, slightly bluish in color
3. A rapid and weak pulse
4. Shallow respiration, sometimes sighing in nature
5. Nausea and vomiting
6. Dizziness
7. Dull eyes, possibly listless in appearance, with pupils possibly dilated
8. Victim conscious or unconscious

The symptoms and signs in items 1 through 7 should be noted so that treatment can be started immediately.

Fig. 26. Recognizing signs of shock

Control of Shock

The major objective in the treatment of shock is to improve the blood circulation to the brain. To accomplish this, the first aider should take the following actions:

1. The injured person should be placed in a horizontal position. He or she should be level; however, the feet and legs may be elevated if it is comfortable for the injured person and convenient to elevate them (Fig. 27).
2. If possible, the injured individual should be insulated from the ground or from a cold surface, if he or she is lying on one, by having a blanket, clothing, or other soft material placed underneath the body to reduce the loss of body heat. The injured person should be kept warm but should be prevented from getting hot. The use of a chemical heating pad or a hot water bottle may be valuable in reducing the loss of body heat. However, great care should be taken to prevent burning the injured person. A general rule to use in covering a person to keep him or her warm is that two layers of material should be placed underneath the person for every one layer on top. The injured person should not be made to perspire, because perspiring can cause further loss of body fluid and can aggravate shock. The amount of covering should be based on the surrounding temperature.

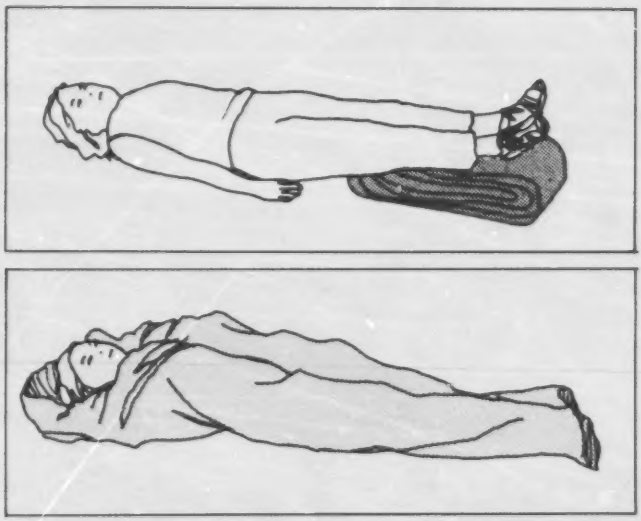


Fig. 27. Placing shock victim in horizontal position and making the person comfortable

3. Personal contact should be maintained if possible.
4. The injured person should be comforted and reassured, because anxiety tends to increase shock.
5. The injured person should be kept quiet.
6. If the injured person is unconscious, no attempt should be made to give anything by mouth. The injured person should be turned on the side so that if vomiting occurs, he or she will not aspirate the vomit (draw it into the lungs).
7. If the victim is conscious, the first aider should not give him or her any liquid to drink or food to eat, because eating or drinking may precipitate vomiting and increase the danger of aspirating the vomit. Also, for certain kinds of medical treatment to be done later on, the person's stomach must be empty.
8. The first aider should check for injury. Shock has been caused by some mechanism that has interfered with bodily processes. Such shock may have been caused by an injury; therefore, if the first aider is not sure why shock has developed, he or she should check for injuries, as described earlier. The first aider should be sure to check for bleeding.
9. No alcohol or drugs should be given to the injured or ill person.

XI
Poisoning and Drug Overdose

Poisoning may be accidental or intentional. Instances have occurred in which children have made suicide attempts with poisons just prior to school or on their way to school. Poisoning constitutes a true emergency, and the fastest available help should be sought. If an ambulance is quicker, the first aider should call an ambulance. However, if transportation to medical assistance by bus is quicker, then the first aider should transport the victim by bus.

Signs and Symptoms of Poisoning

The signs and symptoms of poisoning are too many and too complex to discuss in detail in this manual; however, the major symptoms that one might encounter in actual cases are the following:

1. Nausea and vomiting
2. Drowsiness
3. Unconsciousness
4. Hyperexcitability
5. Disorientation or confusion
6. Abdominal pain
7. Impaired coordination
8. Convulsions

In cases of severe poisoning, breathing may stop, and rescue breathing should be started immediately.

Actions to Take for Poisoning

The following actions should be taken immediately in cases of poisoning:

1. Transport the victim quickly.
2. Encourage the victim to vomit. If the poisoning was caused by a pill or a solid substance, have the person stick his or her finger down his or her throat to induce vomiting. However, if the substance has a strong base, such as lye, or is a strong acid, nothing should be done except to transport the victim to a medical facility as quickly as possible.

3. If breathing stops, begin rescue breathing.
4. If shock develops, treat the victim for shock.

Problems can occur from inducing vomiting in persons who have taken liquid poisons. Therefore, it probably would be better to wait for trained medical care before a decision is made to induce vomiting in cases involving the ingestion of liquid substances.

Important: If the ill person is conscious, the first aider should ask at once what he or she took. The ill person may lapse into unconsciousness in the next few minutes. If containers are available from which the substance was taken or if some of the material is still present, the first aider must make certain that the substance is taken with the person to the place where he or she will receive medical care. Identification of the substance that caused the illness can be extremely important in the eventual treatment at a medical facility.

Drug Overdose

Drug use by schoolchildren is alarmingly high. Drugs that are taken for other than their intended purpose fit into several categories. These drugs may be taken by mouth, by injection, or by sniffing.

1. "Uppers"—Uppers are usually considered stimulant drugs. They can cause silliness, hyperexcitability, confusion, and anxiety. These drugs can also cause the drug abuser to feel that someone is pursuing him or her with the intent to do bodily harm. Persons using "uppers" may be restless and irrational. The correct action to take with abusers of "uppers" is to get the person to a medical facility for evaluation.
2. "Downers"—Downers are drugs that can cause sleepiness, reduced activity, depression, shock, and respiration failure. The correct action to take with abusers of downers is to give rescue breathing if the ill person's breathing stops and to transport the person rapidly to a facility for medical care, because the person's condition can become rapidly worse from a drug overdose.
3. "Psychedelics"—Psychedelic drugs can cause mental distortion. Sometimes, they are pleasant in their effects, but sometimes they can also be terrifying in their effects (can cause a drug reaction or "bad trip"). The treatment for persons that have this condition (i.e., a bad reaction) is to avoid excitement and to reduce the amount of activity around the ill person as much as possible. The first aider should quietly assure him or her that everything is all right and that he or she is simply having a bad drug reaction. The person with a bad drug reaction should be transported to a medical facility for medical observation and evaluation.

Although psychedelic drug overdose does not have the same potential for serious effects as overdose with the uppers and the downers, nevertheless, its potential for causing serious mental disorders is great, and medical evaluation should be made as soon as possible. If the substance that the ill person has taken is available, a sample of the substance should be transported with the person so that an identification can be made and the most effective treatment can be given.

When bizarre, unexplainable behavior occurs in a person, drug ingestion should be suspected and an evaluation by a trained medical person should be carried out.

XII
Medical Emergencies

This chapter includes a number of conditions that range in seriousness from simple headaches to insulin reaction or to severe chest pains. Most of the conditions discussed require medical evaluation.

Headache

Headache is a symptom that is very common among children but that sometimes can be quite severe. If a child with a headache will not be able to receive medical care for sometime because of being on a bus, several simple things can be done in an attempt to relieve the headache:

1. Reduce the child's activity. Have the child lie down and keep him or her quiet.
2. Apply a cold, wet cloth to his or her head.
3. Try to reduce the noise level if possible. If the noise level cannot be reduced and if noise bothers the child, make earplugs from either cotton or paper tissue, and put the plugs into his or her ears.
4. Reduce the amount of light by keeping the person in a shaded area or by placing a cloth over his or her eyes.

Vomiting

Many things can cause vomiting: car sickness, food poisoning, incorrect eating, stomach flu, medicines, and so forth. Vomiting sometimes can be associated with severe illness, and the sick person should be evaluated by trained medical personnel.

While vomiting, a sick person should be bending over, and someone should hold his or her forehead if possible. When lying down and vomiting, a sick person should be on his or her side to reduce chances of aspiration of the vomit.

When the retching has ceased, small sips of water or a soft drink in very small amounts may make the sick person feel better. The person should be given no more than a teaspoonful (about 5 millilitres) every five to ten minutes.

Diarrhea

The sudden onset of cramps and severe diarrhea may occur while a child is riding a bus. Diarrhea and cramps can be caused by many different factors.

In cases of cramps and severe diarrhea, the first aider should use an undershirt, sanitary pads, paper towels, paper tissues, and so forth in large quantities to prevent extensive soiling of clothing while the sick person is being transported to a medical facility where he or she can get proper medical care.

Intestinal Cramps

Sudden onset of intestinal cramps can be extremely painful. However, ice in a plastic bag or a chemical cold pack applied to the abdomen may alleviate cramping to some degree. If cramps are persistent, the need for medical evaluation is indicated.

Diabetes

Many persons have diabetes (sugar in the blood) for which they must take insulin. Insulin helps the person's body to use the sugar in the blood properly. However, if the person has taken insulin and has not eaten correctly, an insulin reaction can occur. The insulin reaction is caused by the insulin's reducing the sugar in the blood to a dangerously low level. When the sugar in the blood drops to a certain point, convulsions will occur, causing a sudden and acute emergency. If it appears that a person is going to develop an insulin reaction but is still conscious, the person should be given a candy bar, some sugar, or a nondiet soft drink. In fact, if the person is a known diabetic, he or she may be carrying one of these items for use in such an emergency. If the ill person does not have any of these items, the first aider should give candy, honey, juices, or nondiet soft drinks as quickly as possible. These foods or drinks may prevent the sugar in the ill person's blood from dropping to a point where unconsciousness will occur. If unconsciousness does occur, no food or drink should be given, and the person should be transported as rapidly as possible to a medical facility where he or she can receive the correct medical care.

Asthma

Many persons have asthma and may develop severe asthmatic attacks while riding a school bus. These attacks are characterized by difficulty in breathing and sometimes severe apprehension. Severe asthma is a serious medical problem.

The first aider should put the ill person in a position of comfort. This position of comfort is usually a semisitting or a sitting position. Then the person should be transported as quickly as possible to a

medical facility where he or she can get the correct medical care. Reassurance is important in reducing the person's anxiety, and the first aider should do everything possible to reassure the sick person.

Allergic Reactions

Allergic reactions may occur suddenly and may make the victim quite uncomfortable. However, only a few of them are serious and life-threatening. Reactions such as hives, hay fever, swelling and burning of the eyes, and cough may cause discomfort, but transporting the ill person to medical care by conventional means is usually satisfactory.

Two allergic conditions can be extremely serious and may be life-threatening. These are allergic shock and allergic swelling.

Allergic (anaphylactic) shock. Allergic shock is caused by exposure to a substance to which the individual is highly allergic, and this condition can develop very rapidly. A common cause of allergic shock is bee stings. A person who has had a bad reaction to a bee sting on a previous occasion is likely to develop this condition if he or she is stung again. Another cause of this kind of reaction is medication to which the person is highly allergic. Penicillin is such a medication for some people and is a common cause of allergic shock.

The signs and symptoms of allergic shock are the same as for other types of shock except that they may develop much more rapidly, and treatment for these symptoms is the same as the treatment for other types of shock. The major consideration in allergic shock cases is transporting the sick individual to medical care as rapidly as possible.

Allergic swelling (angioneurotic edema). The other serious allergic reaction that could develop suddenly in a person is allergic swelling. Allergic swelling is a rapid swelling of the mucous membranes of the mouth and throat. Sometimes, a person's lip, eye, cheek, or tongue will suddenly begin to swell. If this swelling is limited to the face, there is very little danger. However, if the throat begins to swell, breathing can be obstructed, and the person may suffocate. If the sick person stops breathing from swelling of the throat, rescue breathing may be extremely difficult, because the airway is blocked by the swelling. The onset of this condition involving the airway constitutes a grave and urgent emergency, and the sick person should be taken to professional medical help as rapidly as possible. No known first-aid measures will stop this swelling. However, the application of cold may help a little. Sometimes, a person knows that he or she is subject to this kind of allergic reaction and will carry a syringe with medicine in it to stop the reaction. If a person has such medication with him or her, the first aider should assist the person in taking it as rapidly as possible.

Stomach or Abdominal Pain

The sudden onset of stomach or abdominal pain is usually not of great consequence. The "stitch in the side" is frequently caused by an irritated nerve, and usually the pain subsides before long. The same type of "stitches" occur in the region of the chest. However, the slower development and persistence of abdominal pain may herald a serious medical emergency, and such pain should always be evaluated by trained personnel.

Menstrual Cramps

Sometimes, severe menstrual cramps occur. In situations where a half an hour or more may elapse before the girl can be gotten to medical care, the first aider should apply heat to the abdominal area if possible. Many times heat will relieve menstrual cramping to some degree.

Chest Pain

Crushing chest pain that radiates down the left arm, down both arms, to the shoulder, to the back, to the neck, or to the jaw is indicative of a possible heart attack. In an older individual particularly, chest pains may be the symptoms of a heart attack. An individual with any of these symptoms should be transported immediately to a medical facility for professional medical care. If the ill person stops breathing, the first aider should begin rescue breathing immediately. If the ill person's heart stops, a first aider with training in cardiopulmonary resuscitation (CPR) should begin heart compressions.

In younger people the sudden onset of severe chest pains, associated with shortness of breath, may be indicative of air escaping from the lung into the chest cavity (spontaneous pneumothorax). This condition is caused by the rupturing of a small air sac in the lung, allowing air to escape between the lung and the chest wall and collapsing the lung. Severe pains in the chest, with shortness of breath, can be serious and life-threatening.

Signs and symptoms of heart attack and collapsed lung. The signs and symptoms of heart attack and collapsed lung are the following:

1. Shortness of breath
2. Pain in the chest that radiates to arms, shoulder, back, neck, or jaw
3. Anxiety

Action to be taken when severe pain in the chest occurs. When severe pain in the chest occurs, with shortness of breath, the ill person should be cared for as follows:

1. Keep the victim quiet.

2. Have the victim breathe gently and slowly.
3. Reassure the victim and try to allay his or her anxiety as much as possible.
4. Obtain medical help as promptly as possible.

XIII
Thermal, Chemical and Electrical Injuries

Burns are among the most painful and the most dangerous injuries that a person can sustain. With severe burns a person cannot always tell how serious the burn is, because the degree of seriousness is not apparent.

Classification of Burns

Burns can be classified into three degrees of seriousness—first-degree burns, second-degree burns, and third-degree burns (Fig. 28):

1. First-degree burns—First-degree burns involve the outer layer of skin and cause reddening, tenderness, and pain. However, the skin remains intact.
2. Second-degree burns—Second-degree burns involve a partial loss or separation of the outer layers of the skin (blister formation). The outer layers of the skin are destroyed when blisters develop. Second-degree burns are more painful than first-degree burns; and when second-degree burns are extensive, shock can occur.
3. Third-degree burns—Third-degree burns involve the entire thickness of the skin, and the skin may be charred or white. These charred areas are usually surrounded with areas of first- and second-degree burns. The area of skin sustaining the third-degree burn may not have any sensation; however, the skin surrounding the third-degree burn usually will be severely painful. Shock will develop rapidly if the third-degree burn is extensive.

Care of Second- and Third-Degree Burns

Second- and third-degree burns are prone to infection, and great care should be taken to prevent contamination and infection. Second-degree burns that involve several square inches (square centimetres) of skin or more should receive medical attention. Second-degree burns that are extremely painful or that involve multiple small areas or a large area of skin also should be examined as quickly as possible

by someone trained in medical care. All third-degree burns must receive medical attention as rapidly as possible.

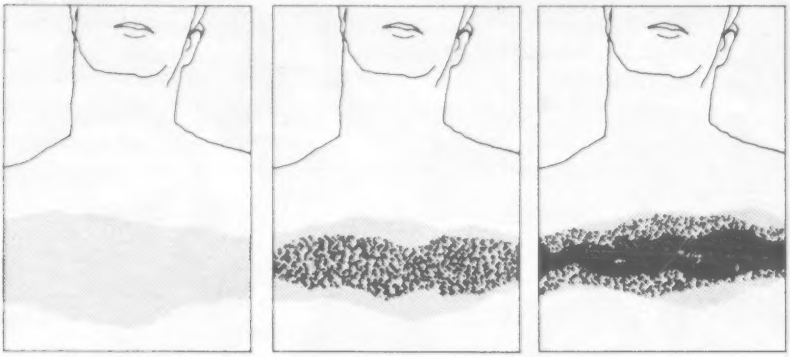


Fig. 28. Classification of burns; first, second, third degree

Actions in the Treatment of Burns

Cool running water will relieve the pain of first-degree and second-degree burns. Cool water should be allowed to run over the burn for approximately 20 to 30 minutes so as to reduce the pain and the inflammatory action that is likely to develop immediately following a burn.

The first aider should not use grease of any kind, because grease holds the heat in and may prolong the burning sensation. If the burn area is large, the first aider should cover the area with a wet sheet or towel, keeping the cloth continually wet until medical care is reached. In the case of third-degree burns, the entire burned area should be covered with a wet sheet, towel, or clean wet cloth; and the burned person should be transported to medical care as rapidly as possible. Extensive third-degree burns constitute a major medical emergency.

Special Considerations in Treating Burns

The following special precautions should be taken by the first aider in treating burn victims:

1. Clothing should not be pulled over a burned area. If possible, the first aider should cut the clothing free. This action will prevent further damage to already painful and damaged skin. If clothing sticks to the burned area, it should be left alone. Then the first aider should cut the loose clothing free and should cover the entire burn area with a clean cloth that has been saturated with clean cold water.

2. Burns are easily infected. To prevent contamination and infection, the first aider should not cough or sneeze on a burned area, touch the burned area directly with unwashed hands, or put a dirty cloth or dirty clothing over a burned area.
3. Once the dressing is applied, the first aider should not remove it to examine the burned area. If the dressing begins to dry out, water should be poured over the entire burn area and allowed to soak through the dressing.
4. A person with a moderate to severe burn who is going to see a physician within an hour should be given no food or water. A person may need to have an anesthetic, and his or her stomach should be empty when the anesthetic is given. If the burned area is small or if the burn is of a minor nature, small sips of water may be given.

Acid and Alkaline Burns

Acid burns may be caused by battery acid, chemicals from a school laboratory, swimming pool acid, or other strong acid products. Alkaline burns are most commonly caused by lye and similar strong caustic substances, which are found in plumbing drain cleaners. The difference between acid burns and alkaline burns is not so important, since the treatment for both is essentially the same. The major significance is that alkaline burns may be more serious in nature than acid burns because of the ability of alkaline substances to spread through the skin and underlying tissues. Acids tend to burn only the skin with which they come in contact. If the first aider suspects that a child has sustained a burn from any kind of chemical or solution, no further assessment is necessary before beginning treatment.

Immediate profuse flushing of the skin with water or with any available bland solution should be done immediately. Alternate solutions to water are milk and other cold beverages. Following profuse irrigation of the area in contact with the chemical, the burn should be treated as a burn caused by heat, as discussed previously.

Electrical Burns

Electrical burns are very deceptive and can be extremely serious. The reason for this deceptiveness is that the point of electrical contact on the skin may show only a small burned area. However, underneath the point of contact on the skin, extensive damage can be done by the heat generated from the electrical energy.

Signs of severe electrical burns. In severe electrical burns the person may have a burn not only at the contact point but also at the grounding point where the energy was discharged from the body. For example, a person touching a wire with the back of his or her hand

may have a burn the size of a quarter on the hand but may have another burn of similar or greater size on the heel of his or her foot. Such a burn can frequently be fatal because of the extensive injury that the electricity does in passing through the body. A person coming in contact with high voltage may lose consciousness, stop breathing, and have heart failure (Fig. 29).

Action for electrical burns. The first aider should evaluate the situation to make sure the injured person is not still in contact with the source of electrical energy. Before touching the injured person, the first aider should have the power shut off. If disconnecting the power would take too long or is impossible, efforts must be made to remove the injured person from the source of electricity with a dry stick or board. The stick or board should be wrapped with several thick layers of dry clothing or some other nonconductive material. A rubber mat makes an excellent nonconductive padding for such a purpose (Fig. 30). Great care must be taken by the first aider to prevent exposure to secondary injury from electrical current passing through the injured person into his or her own body. When the injured person is no longer in contact with the source of electrical energy, immediate resuscitative efforts should be started. (See Chapter IV, "Breathing and Airway Maintenance," p. 17.) An electrical burn is treated as any other burn. However, a person exposed to severe electrical shock must have an immediate medical evaluation.

Heat Stroke

Heat stroke can occur when a person has been exposed to high temperatures for a long period of time. Heat stroke should be differ-

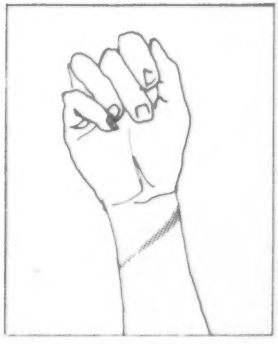


Fig. 29. Burn caused by contact with high voltage

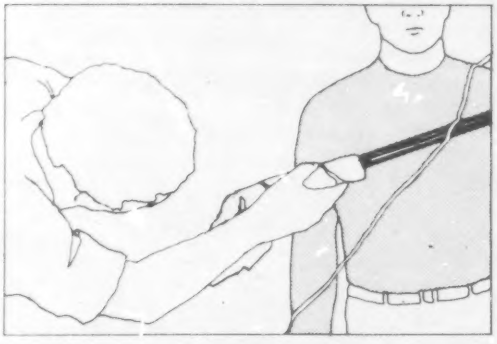


Fig. 30. Insulated stick for removal of live electrical wire

entiated from heat exhaustion, which shows different signs and which is treated differently.

Signs and symptoms of heat stroke. The signs and symptoms of heat stroke are as follows: the affected person is usually flushed; the person's skin feels warm to the touch; and the person's heart may be beating rapidly and forcefully.

Actions for heat stroke. A person who has suffered heat stroke must be cooled as effectively as possible by using the following procedure:

1. Move the ill person to a cool, shaded spot if possible.
2. Apply cool water to the skin in liberal quantities. The face, legs, arms, and exposed portions of the body must be bathed continuously with cool water until the ill person's condition has been evaluated by a medical practitioner.
3. If the ill person is conscious, give him or her small sips of water.
4. If cold packs are available, place these at the head and neck and next to the body.

Heat Exhaustion

Heat exhaustion differs from heat stroke in that the person ill with heat exhaustion can lose excessive salt and fluid from his or her body, which can cause a state similar to shock.

Signs and symptoms of heat exhaustion. The person ill from heat exhaustion may be weak, may have cool and moist skin, and may have a weak and rapid pulse.

Actions for heat exhaustion. A person who has suffered heat exhaustion must be treated in accordance with the following procedures:

1. Move the ill person from areas of excessive heat, such as bright sunshine, to a cool, shaded spot.
2. Give the ill person small sips of water or other liquid at frequent intervals. If available, salt tablets may also be given.
3. Keep the ill person in a lying position if possible.
4. Transport the ill person for a medical evaluation as soon as possible. Persons with heat stroke or heat exhaustion should be transported in a lying position for a medical evaluation and should be made as comfortable as possible.

XIV
Foreign Bodies

Foreign bodies in the throat, the windpipe, and the eye have been covered previously. (See chapters IV and VII.) This chapter deals with foreign bodies in the ear and nose, splinters lodged underneath the skin, and impalement.

Foreign Bodies in the Ear and Nose

Foreign bodies in the ears and noses of children can present problems for the bus driver. Children are prone to put beans, wads of paper, beads, and other small objects in their noses and ears and then not be able to get them out. The first aider must prevent the child from attempting to get the foreign body out, because frequently attempts to remove foreign bodies have resulted in much more damage than the foreign bodies themselves could have caused. The best approach is to transport the child to a health care facility, where a health professional can remove the foreign body with the least amount of injury to the surrounding tissue. If one side of the nose is stopped up by a foreign object, the object can sometimes be dislodged by having the person take a deep breath through the mouth, tightly close the mouth, hold the unobstructed side of the nose closed, and try to blow the foreign object out by forcefully exhaling against the object.

Splinters

Splinters of wood or metal may accidentally become lodged underneath the nails or the skin of children. If a splinter is superficial, the first aider may attempt to remove it by grasping the splinter with the fingernails and pulling it out. If the splinter is deep or if it has penetrated the skin or underlying tissue, the first aider should not attempt to remove it. Rather, he or she should apply a dressing and have the child transported to a medical facility for professional medical assistance.

Impalement

Occasionally, in serious accidents, large pieces of metal, wood, or other materials are driven into the bodies of accident victims. For example, sometimes a guardrail along a roadway is splintered in an accident and is driven into the passenger of a car. In such an accident involving impalement, the first aider must observe the following:

1. Do not try to remove the foreign material from the accident victim's body.
2. Wait until the fire department or a rescue squad arrives to cut the person free if part of the foreign material that penetrates the victim is fixed. However, if the object upon which the person is impaled is free of attachment, transporting the victim to a medical facility without attempting to cut any of the material off may be the best course.
3. Do not try to remove the injured person from the fixed object. If you attempt to do so without a physician in attendance, you may cause his or her death.

XV
Bites and Stings

Bites and stings can be a very serious threat to the health of victims because of the great danger of infection, disease, poisoning, and allergic shock.

Human Bites

One of the most dangerous bites a person can sustain is a human bite, because human bites are the most likely to become infected. Sometimes, the infection from a human bite can be extremely serious. Therefore, all human bites should be evaluated by a physician even though the bite may not appear to be extremely serious. In the case of a person sustaining a human bite, the first aider should wash the bite area thoroughly with soap and water, apply a clean dressing, and transport the bite victim to a health facility for medical evaluation and treatment.

Animal Bites

The greatest danger from animal bites is the danger of rabies being transmitted to humans. Although house pets may have been immunized against rabies, the pets must be observed after they bite to ensure that they are free from rabies. Rabies can be picked up by domestic animals from wild animals, such as skunks or squirrels, and then transmitted to people. In addition to rabies, animal bites are likely to cause infection; therefore, immediate medical care is necessary in preventing infection.

Animal bites, like human bites, should be washed thoroughly with soap and water as soon as possible after the injury occurs, because of the necessity of removing saliva and bacteria that have been introduced into the wound from the mouth of the biting animal (Fig. 31). The animal that did the biting, whether domestic or wild, should be captured and contained in a box or pen to make possible an examination by a veterinarian. If capturing the animal alive is impossible, it should be killed without damaging the head so that a pathologist or health official can determine whether rabies is present. Also, care

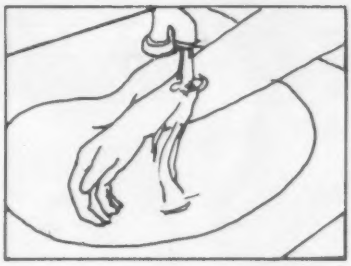


Fig. 31. Washing a bite for saliva and bacteria removal

must be taken in capturing or killing the animal to prevent another person from being bitten.

Rabies is considered to be 100 percent fatal when it develops in human beings. Therefore, an animal that has bitten a person must be examined to determine whether it is rabid. If the animal were not examined, then a person that had been bitten would have to undergo a long and painful series of treatments to immunize him or her against the development of rabies. There is no way to tell whether the animal is rabid or not without a pathological examination. The assumption must be made that the animal that has bitten a person was rabid, and the person must be given these painful treatments. Therefore, it is extremely important that the animal be identified, captured, or killed so that it can be examined to avoid this long and painful course of treatments for the person that has been bitten.

The bus driver should take care in letting small children off a bus when animals, especially dogs, are in the immediate vicinity. A large dog can terrify a small child, and the child could be bitten seriously.

Snake Bites

With snake bites, knowing whether the snake is poisonous or nonpoisonous is necessary. This can be determined by capturing or killing the snake and bringing it to the medical facility with the person who has been bitten. Poisonous snakes tend to have wedge-shaped heads and narrow necks, and they have depressions behind their eyes called "pits." When a poisonous snake bites, it punctures the skin with its two fangs, and it injects the poison through those fangs. The bite of a poisonous snake looks like two puncture holes; however, the bite of a nonpoisonous snake usually will show a row of teeth marks (Fig. 32).

When a person has been bitten by a poisonous snake and medical assistance is less than 15 to 20 minutes away, the victim should be transported immediately to a medical facility. This procedure is better than wasting time in attempting to give first-aid treatment at the site. However, if trained medical help will not be available for 30 minutes

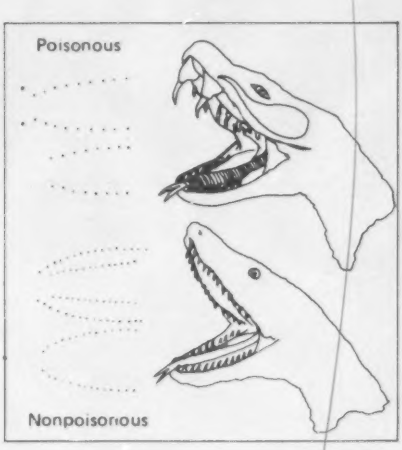


Fig. 32. Heads of snakes showing fangs and teeth

or more after the person is bitten, then the following treatment should be carried out (Fig. 33):

1. Make parallel, longitudinal incisions ¼ inch (about 0.5 centimetres) long over the fang marks and completely through the skin. If a lancet, such as is found in a snakebite kit, is not available, a clean razor blade will do. These incisions should be made to run in the same direction as the bone and blood vessels in a leg or an arm, rather than crosswise. The danger of cutting a vein, tendon, or nerve is lessened when the incisions are made to run parallel to the bones, blood vessels, and nerves.
2. Apply suction over the incisions in an effort to draw out some of the venom.
3. Place a constricting bandage several inches above the bite.
4. Apply cold compresses over the bite. Ice packing should not be done. If the bite is on the body, rather than on an arm or a leg, the incisions can be made and the suction can be applied, but a restricting bandage should not be used.
5. Keep the victim as quiet as possible, and permit him or her only the amount of movement that is necessary to get him or her to a medical facility as quickly as possible.

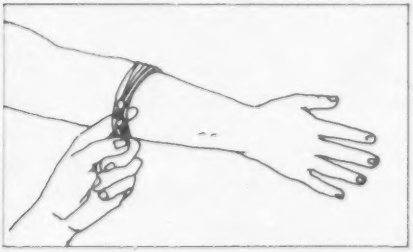


Fig. 33. Treating victim for bite of poisonous snake

Insect Bites or Stings

Insects that bite or sting include spiders, scorpions, ticks, wasps, bees, and some other flying and crawling insects. These insects can cause poisoning, infection, disease, and allergic shock.

Spider bites. Spider bites can sometimes be quite serious, and they should be evaluated by a health professional. The black widow spider is notorious for causing severe symptoms. The black widow can be recognized by its black glossy body and a red hourglass marking on the abdomen. If a person is bitten by a black widow spider, the first aider should apply cold compresses and have the person transported immediately to a medical facility for treatment.

A number of other spiders and scorpions found in California can cause relatively severe symptoms. However, any spider bite that apparently causes a great deal of pain, swelling, and shock symptoms should be considered serious, and any person bitten by one of these should be transported immediately to a medical facility for treatment. The only immediate first-aid care that can be given for such a bite is the application of cold.

Tick bites. Wood ticks often will be picked up by children and adults who have been wandering in the bushes or in the woods. These wood ticks embed themselves in the skin, and they suck blood until they become quite puffed up and blue with blood. They are dangerous because they can transmit diseases, such as tick paralysis and Rocky Mountain spotted fever. The treatment for ticks is the application of a small piece of cotton or tissue that has been saturated with gasoline (or kerosene if available). This treatment will stop up the breathing apparatus of the tick, and within a few minutes, the tick will release its grip. Then the first aider should be able to remove the tick from the skin without difficulty. If this treatment does not work, then a health professional should remove the tick (Fig. 34).

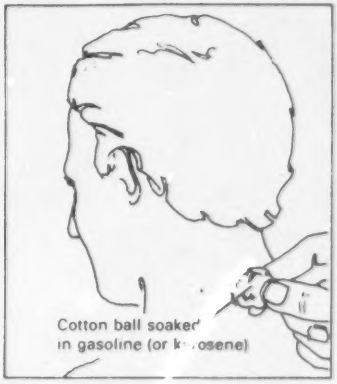


Fig. 34. Removing ticks and treating tick bites

Stings. Wasps, bees, yellow jackets, and other flying insects may sting a person and cause a great deal of pain and discomfort. Aside from the pain and discomfort, the main danger from stings is the development of allergic shock, which can cause a person to go into severe shock and die. (See chapters II and X on shock.) As for treating the sting itself, the first aider should apply cold to the area that has been stung to help relieve some of the initial symptoms. If multiple stings have occurred, the child must be evaluated by a health professional and treated whether he or she shows symptoms of shock or not. Signs and symptoms that may develop after multiple stings are nausea, vomiting, fever, and headache.

XVI
Mental Health Emergencies

Certain types of emotional behavior in some children may be very disruptive on a school bus. The bus driver may have the opportunity to observe these children in a nonstructured environment and, thus, may suspect some extremely serious emotional problems that need immediate evaluation and treatment. The following are a few simple suggestions that might be used by the bus driver as a temporary means of helping children with emotional problems until he or she can get them professional assistance.

Panic

When a child feels that his or her inner resources are inadequate for meeting the immediate demands of a stressful situation, he or she is likely to react with panic. On a school bus this may take the form of extreme emotional agitation, and the child may have a strong desire to get off the bus, even though he or she has no appropriate place to go when off the bus. A person in such an agitated state cannot be reasoned with easily and is driven by forces over which he or she has no control. If at all possible, the child should be taken firmly by the arm or the hand and led away from the rest of the group. When this is done, the child should be given an opportunity to describe his or her anxiety and the cause of the panic. He or she should be encouraged to talk and should be given reassurance. The first aider should tell the child that he or she will receive professional help to relieve the panic symptoms. Being angry with such a person and failing to show understanding are likely to make the condition worse.

Rage

Children occasionally find themselves in situations where they are unable to cope with taunts, teasing, or other antisocial stresses. On these occasions, some children may go into an uncontrollable rage. During such a rage their judgment is greatly impaired, and they could cause serious injury to themselves or others. If necessary, a child in rage should be forceably separated from the group he or she is with and should be taken to a quiet place, if possible. Here the child should

be permitted to express verbally to a sympathetic listener his or her hostility and frustration. The child should be reassured of his or her safety, and when returned to the group, he or she should be separated from those who caused the rage. The child should be placed with those who are either neutral or are supportive of his or her situation. If such protection and isolation from the stressful environment do not seem possible, then separate transportation should be arranged for this child.

Hysteria

Medically, hysteria is exhibited through a number of manifestations; however, the popular idea of hysteria is that of an individual engaged in uncontrollable laughter or crying. The reasons for this idea may be varied; however, the treatment and care that should be given to an individual with hysteria are essentially the same as for panic and rage. The hysterical individual should be removed from a crowded to a quiet place and helped to calm down while being reassured. Slapping such a person or throwing cold water in his or her face is not necessary. Verbal control of such behavior is possible with understanding and patience.

Anxiety

A certain degree of anxiety under appropriate stressful circumstances is a normal component of human behavior. However, uncontrolled anxiety—especially anxiety that is not appropriate for the situation and that seems to be far in excess of circumstances that produced the anxiety—may be a problem with some children and may need to be dealt with immediately on an emergency basis. While panic, rage, and hysteria may best be controlled by taking the affected child away from the group and talking to him or her alone, anxiety may best be handled by letting the child remain with the group where he or she may feel the security of their support. The child's being given reassurance about the situation causing his or her anxiety may not be very helpful generally; however, bus drivers should assure the child of their individual concern and support regardless of what the child's circumstances are.

One of the manifestations of anxiety is hyperventilation. Hyperventilation can occur when the individual breathes too fast, which causes rapid exhalation of carbon dioxide from the body, resulting in an upsetting of the chemical equilibrium in the body and causing a tightening of certain muscles. This tightening of muscles can be noticed especially in the hands and fingers, which take on a clawlike appearance. Also, numbness and tingling, especially about the mouth and face, are symptoms that indicate the person is having an anxiety reaction. In addition, the symptoms of hyperventilation increase the

anxiety. Hyperventilation symptoms should be relieved, if possible, when first recognized. To do this, the affected person should hold his or her breath for 30 to 40 seconds several times in succession. If the affected individual is unwilling to do this breath-holding exercise, he or she should be encouraged to breathe into a paper bag, thereby breathing back into the lungs some of the carbon dioxide that was lost through hyperventilation. Breathing into a paper bag should relieve the symptoms considerably within two minutes. (*NOTE:* After two minutes, the victim should be allowed to breathe unrestricted for at least two minutes. If necessary, he or she can then breathe into the bag for another two minutes, followed by two minutes of unrestricted breathing, and so on.) Anxiety may precede panic or hysteria; therefore, treating the anxiety as soon as it develops may prevent some of these more serious problems from developing.

Depression

The child who is not responsive to his or her environment, who wants to be left alone, who appears moody, and who may cry without apparent cause may be suffering from depression. When it is severe, depression may promote suicidal thoughts or actions. Therefore, observing the behavior of children for any great departure from normal behavior or for behavior different from that of the group is important. Generally, a depressed person will not want to talk very much, and such an individual should be closely observed to ensure that he or she does not do something to hurt himself or herself. A child's withdrawn behavior should be reported to a school authority.

Paranoia

A certain amount of suspiciousness by a child as to the motives of others in the area is natural. However, when this suspiciousness tends to isolate that child from the environment or when it appears totally unfounded as far as the observer is concerned, the child may need professional help. The professional help is needed particularly if the child refers or reacts to voices or visual things that are figments of the imagination. Recognizing these symptoms, evaluating their validity, and reporting them may be extremely helpful for the professional who will make the eventual examination.

Amnesia

Amnesia refers to loss of memory. If a child is subjected to a blow on the head, he or she may have a period of forgetfulness and may not recognize things and people in the environment. This amnesia condition may follow a period of unconsciousness, or it may follow just a blow to the head. Also, amnesia may follow a convulsion. However, sometimes amnesia comes on without any history of illness or injury.

If the amnesia follows an injury or convulsion, the child needs a medical evaluation. A child who has amnesia without a history of injury or convulsion needs a psychiatric examination.

Schizophrenia

Schizophrenia is a serious mental disorder in which the behavior of the individual is bizarre and inappropriate to the situation in which he or she finds himself or herself. Also, the person may not be appropriately responsive to contacts in his or her environment. When this type of behavior is seen in a child, drug-induced behavior should be suspected, and inquiries should be made as to whether the child has taken any drugs or medications. Such behavior is not always evidence of drug abuse, but certainly drug abuse must be considered. When any of these elements of behavior is present, the situation should be considered an emergency, and the following procedure should be adhered to:

1. Evaluate the circumstances in which the unusual behavior of a child originated and was first noticed.
2. Take the appropriate action that has been discussed for each type of behavior.
3. Report any unusual behavior of a child to the school nurse or to some other school authority if you have reason to believe that such behavior was inappropriate and a marked deviation from what you would have expected from the child.

XVII
Summary

Certain important items should be remembered in particular from the material that has been presented in this publication. These important items are the following:

1. Do no harm. Doing nothing is better than doing the wrong thing.
2. Remember that with all injuries and illnesses various degrees of anxiety are present. Comfort, support, and reassurance are among the most valuable first-aid measures at your disposal.
3. Remember to evaluate the whole person and to base your priorities for treatment on the threats to the life and the recovery of the ill or injured individual. Breathing, heartbeat, circulation, bleeding, shock, and head injury are the main threats to life. Infection and aggravation of injuries, such as fractures, are the major threats to recovery.
4. Intelligent evaluation of the transportation needs based on the condition of the ill or injured person is as important as the treatment that is given him or her. Use common sense in determining how and when an ill or injured person should be moved.
5. Gather all the appropriate information possible about the circumstances and the condition of the ill or injured person when you first see the individual. Consider communication as a vital link in the chain of first-aid care. Be sure that the important information is transmitted to the physician who will be giving the professional medical care. If possible, establish a communication link with a health professional while you are at the scene of the illness or accident. Do this either by radio or telephone. Also, determine whether additional instructions that will facilitate the care of the person can be given.
6. Learn cardiopulmonary resuscitation (CPR).
7. Keep *Manual of First-Aid Practices for School Bus Drivers* handy for use as a reference.
8. Do not expect to perform miracles. Even physicians recognize that they are limited in their ability to help some patients. You

are being trained to help people when they become sick or injured only within the skill and knowledge that you have acquired. In some cases this skill and knowledge may be life saving; and in other cases, it may be nothing more than comfort, reassurance, and the prevention of additional injury.

9. Learn the material in this manual as thoroughly as possible, and review it frequently. Relate it to the resource materials contained in your first-aid kit, to the resource assistance available from your passengers, and to all other resources that you may be able to take advantage of along your route.
10. Take a standard and an advanced Red Cross first-aid course if possible, plus a course in cardiopulmonary resuscitation (CPR) from your local fire department, hospital, community college, or other source. These courses will give you an added feeling of security and reassurance.

Index

Abdominal pain. *See* Stomach pain
Abrasions, 14
Airway maintenance, 17—24
Allergic reactions: shock, 58; swelling, 23, 58
Amnesia, 75
Antichoking maneuver. *See* Heimlich Maneuver
Anxiety, 24, 74
Arteries, damage to, 10—11
Asthma, 23, 57—58

Bandages, 15 (illustrations)
Bites: animal, 68—69; human, 68; scorpion, 71; snake, 69—70; spider, 71; tick, 71
Bleeding: stopping of, 14; tourniquets, 14—16
Breast, injuries to, 41
Breathing and airway maintenance, 17—24
Broken nose, 39
Bruises, 16
Burns: acid, 63; alkaline, 63; electrical, 63—64; general treatment of, 61—62; special considerations in treating, 62—63

Cardiopulmonary resuscitation, 8
Chest pain: causes of, 8, 24; actions to take for, 59—60
Choking, 17—19
Circulation problems, 10—11, 16
Convulsions: in epileptic seizure, 47; in diabetic reaction, 47—48; from emotional causes, 48; from head injury, 48; from toxic conditions and substances, 48
CPR. *See* Cardiopulmonary resuscitation
Cramps: intestinal, 57; menstrual, 59
Cuts and lacerations: general information on, 13; of the eye, 36—37

Diabetic reaction. *See* Convulsions
Diarrhea, 57
Depression, 75
Drowning, 22. *See also* Rescue breathing
Drug overdose, 54—55

Ear injuries, 37—39
Electric shock, 1
Epilepsy. *See* Convulsions
Eye injuries: blow-type, 36; chemicals in, 37; cuts, 36—37; foreign bodies in, 37; lacerations, 36; scratches 36—37

Fainting, 47
Fractures: care for victim of, 28; examinations for, 26—27; splints for, 28—30

Gases, dangerous, 1
Genital organ injuries, 41—42

Headache, 56
Head injuries: actions for, 34—35; ear, 37—39; eye, 35—37; lip, 40; nose, 39; principles to be followed with, 34; teeth, 40—41; tongue, 41
Heart attack, 8, 59—60
Heartbeat, lack of, 8—9
Heart failure, 9
Heat exhaustion, 65
Heat stroke, 64—65
Heimlich Maneuver, 18—19
Hyperventilation, 24
Hysteria, 74

Impalement, 67

Lacerations. *See* Cuts and lacerations
Lip injury, 40
Litters, 45

Menstrual cramps, 59
Mental health emergencies: amnesia, 75; anxiety, 24, 74; depression, 75; hysteria, 74; panic, 73; paranoia, 75; rage, 73; schizophrenia, 76
Mouth-to-mouth breathing. *See* Rescue breathing
Muscles: cramps in, 25; pulled, 25; sprained, 26; strained, 25

Nerve damage: examination for, 16
Nosebleeds, 39
Nose injuries: broken nose, 39; nosebleeds, 39

Panic, 73
Paranoia, 75
Poisoning, 53—54
Pulse: abnormalities, 9—10; taking of, 8—9

Rage, 73
Rescue breathing, 20—22

Schizophrenia, 76
Shock: allergic reactions, 58; causes of, 49—52; control of, 51—52. *See also* Electric shock
Spinal injuries: caring for victim of, 32—33; examination for, 31—32; moving victim of back injury, 33; moving victim of neck injury, 32; neck splint, 32; spine splint, 33
Splinters, 66
Splints: for ankle fracture, 28; for collarbone fracture, 29; for elbow fracture, 29; for forearm fracture, 28; for hip fracture, 29; for knee fracture, 29; for leg fracture, 28; for neck injury, 32; for open or compound fracture, 30; for spine injury, 33; for thigh fracture, 28—29; for upper arm fracture, 29; for wrist fracture, 28
Stings: bee, 72; wasp, 72; yellow jacket, 72
Stomach pain, 59
Sucking chest wounds, 22—23
Swelling. *See specific injury or disorder*

Teeth: tooth injury, 40—41; toothache, 40—41
Tongue injury, 41
Tourniquets, 14—16
Transportation of the sick and injured: five-person lift and carry, 44; litters, 45; principles involved in, 43; six-person lift and carry, 44; two-person chair carry, 44

Unconsciousness, 19—26, 46

Veins, damage to, 10
Vomiting, 56

Wounds, puncture, 13

75843-300 5-83 15M LDA

81-259 03-0506 75843 300 5-83 15M